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Steel Scrap in Cupola Iron Mixtures

Strength of the Product and the Percentages of Scrap—
A Series of Experiments and the Results—
Effect on Hardness

BY E. J. LOWRY*

A KNOWLEDGE of the properties bestowed on cupola cast iron by the addition of steel scrap to the mixtures is of fundamental importance when high strength castings are under consideration. In this article some of the more important characteristics of high-test irons are discussed when obtained under scientific methods of melting.

As a result of the term "semi-steel," the foundryman usually considers that any addition of steel scrap, varying from one per cent and upward, to the

Consequently, when cast iron was ordered the engineer demanded a semi-steel. This caused foundrymen to jump into the manufacture of this class of metal. The movement was without preparation and knowledge. As a result a heavy loss and many exceedingly poor castings were made. This caused the manufacturer as well as the consumer to look skeptically on the increase in strength of cast iron by the addition of steel scrap. Furthermore, some foundrymen learned to contend that such additions were injurious to their melt, while still others have gone to the exclusive manufacture of semi-steel castings.

Limitations on the Percentage of Scrap

From the foregoing, it is evident that there must be some merit in the way steel scrap is melted in the cupola. In other words, conditions in the various foundries and their methods of cupola operation have a direct bearing upon the resulting product. There are limitations which must be placed on the percentage of steel scrap in the mixture and on the arrangement and melting practice in the cupola. These limitations are principally because of the factors of mass, time and temperature.

It is generally conceded that carbon absorption by iron and steel is directly dependent upon time

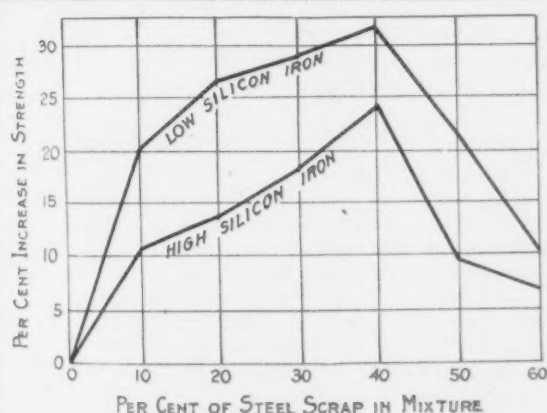


Fig. 1. Percentage Increase in Strength by Steel Additions to Two Classes of Iron Castings

mixture will produce the strongest castings. It is not believed that the originator of this product had such a practice in mind when he placed it before the foundry world. Rather, it is felt that he had in mind a limited variation in the percentage of steel scrap to be used in obtaining the strongest iron for a given analysis. With this idea the term semi-steel was adopted and presented to the trade.

From its inception there has been more or less debate as to the correctness of such a name. Some admirers have performed experiments to prove its worth; others have merely stated that high-test iron would be more correct. It is not within the province of this paper to present arguments either for or against. The trade names are accepted and used throughout the discussion without any bias.

The engineering professions, on learning that steel scrap added to the strength of cast iron, became hopeful of new applications for this material.

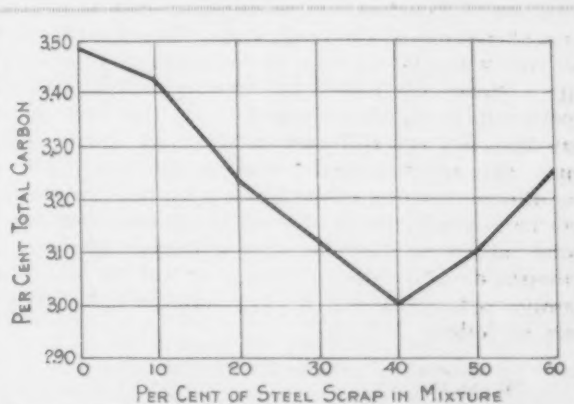


Fig. 2. Effect of Steel Scrap Additions on Total Carbon

and temperature. Therefore, these become necessary elements in the melting of steel scrap in cupola charges. From the iron-carbon equilibrium diagram it is obvious that, as carbon increases in iron, the temperature of melting falls. From these phenom-

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ena, if the time factor is correct, the steel will absorb carbon enough to bring its melting temperature well down to the range of that of the pig iron.

By actual experiment in melting 100 per cent steel scrap charges, it was found that the absorption of carbon readily took place up to 3.00 per cent. These experiments covered various grades of carbon steel, and in each case the final carbon content was within a 0.10 per cent range.

Factors to Be Considered

While discussing the elements which enter into the melting of steel scrap in the cupola, it is well to call attention to the factors which are considered important governors:

1. Diameter of cupola, inside of lining.
2. Height of cupola charging platform above bed.
3. Ratio of tuyere area to melting area.
4. Size of charges.
5. Blast pressure.
6. Volume of blast.
7. Bed charge of coke.
8. Coke charges between iron charges.

These are given as a warning to foundrymen who are not aware of their melting conditions, so that they may forestall their being misled in the be-

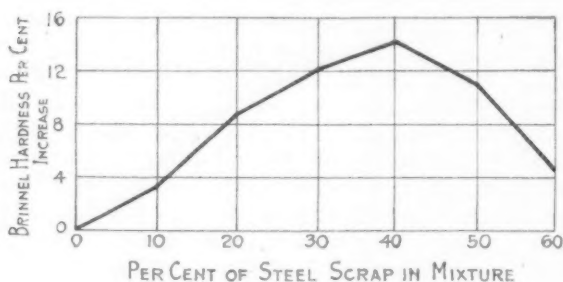


Fig. 3. Effect of Steel Scrap Additions on Hardness of Iron Castings

lief that they can take their original practice, add a little steel scrap and accomplish the results that follow.

The diagrams as reproduced show the average results of many tests run from actual production cupolas in one of the largest foundries in the Middle West. The time consumed by each percentage specified extended over a period of four days, so that the sprue was well worked in. The accumulated data as presented are averages of the samples from each of the four daily heats from which six tests were made. Each of the specimens were broken for strength, analyzed and microscopically examined. The bars were standard test bars and were all poured at 2300 deg. Fahr. The chemistry of the iron was held as near to conformity as possible. Fig. 1 shows the effects of varying percentages of steel scrap in cupola mixtures. The two lines indicate the effect on different analyses of irons. The upper one represents the results obtained from a low silicon, and the lower from a high silicon iron. The base grade, or a no-steel scrap mix, has been listed at zero and the percentage increase in strength as co-ordinates. As a matter of fact, the average strengths of the base grades considered were as follows:

Grades, Silicon, Per Cent	Strengths, Lb. per Sq. In.
0.75	22,000
1.20	29,000
1.50	33,800
1.65	33,900
2.10	33,000

By observing the strength chart, Fig. 1, it is seen that there is a limit to the strength obtainable by the additions of steel scrap. The highest, 40 per cent, which gives the maximum strength, is not to

be recommended for standard practice, as continual daily remelting causes this mixture of iron to become sluggish after 5 to 10 days. The best working percentages to be suggested is between 20 and 30 per cent steel scrap. This gives a good, strong, close-grained iron, and one which gives satisfactory results.

As an explanation of the added strength given to cast iron by the addition of steel scrap, Figs. 2 and 3 are enlightening. Fig. 2 does not strictly adhere to the tests which were run showing that steel scrap absorbed between 2.90 and 3.00 per cent carbon in the melting. This difference may be attributed to the difference in total carbon of the pig iron and scrap used in the mix. The graphs, however, do confirm the statements that steel scrap dilutes the total carbon present in the iron.

Effect on Hardness

The question of steel scrap tending to harden the casting is amplified by Fig. 3. This increase in hardness is appreciably felt in the wear of the casting and is a noteworthy point for the consumers. This increase in hardness is a result of a slightly increased combined carbon content and the smaller formations of the graphitic carbon present.

The microscope shows a distinctive arrangement of carbon formation for each percentage of steel added. There is a marked tendency to break up the large lamellar formations, causing a more even distribution of the carbon throughout the section. The discussion of microscopic formations, however, is outside the scope of this paper, and the readers are therefore referred to the recent work of many of the leading investigators on the subject of cast iron.

In conclusion, the facts as presented show that semi-steel or high-test irons show a marked improvement over the regular cast irons. It is hoped that a more scientific control of the cupola will cause a wider adoption of this practice.

Iron Ore Problems in Birmingham District

Sampling of iron ores in the Birmingham district has been completed by the Southern experiment station of the United States Bureau of Mines, 453 samples having been taken. These samples are being analyzed at the Birmingham and Minneapolis experiment stations of the bureau. A study of mine supports, particularly with respect to the crushing strength of ores, is now under way. Several cubes have been cut from large blocks of iron ores taken from the mines. When this cube sampling is completed, crushing tests will be made with a view to obtaining data on the strength of iron pillars under compression. A detailed study of the ore beds and associated formations is in progress as a preliminary study to the support problem. Interesting results have been obtained in the investigation looking to improvement in the location of ores, particularly with the dip compass.

Contemplated Steel Plant Expansion at Ashland, Ky.

The American Rolling Mill Co., Middletown, Ohio, which some time ago acquired the properties of the Ashland Iron & Mining Co., at Ashland, Ky., is contemplating extensive additions to its Ashland works, principally in connection with its finishing capacity. Proposed extensions will cost in the neighborhood of \$6,000,000. Reports that a \$10,000,000 note issue will be offered by the company in the near future appeared on the financial pages of a number of papers last week, but officials of the company had no information to give out when interviewed.

Rolling mill equipment, recently installed at the Wallingford Cold Rolled Steel Co., Wallingford, Conn., plant, has been successfully tested, and is ready for production.

Electric Motor Drive in Steel Industry

Rolling Mill Requirements as to Power, Speed, Adjustability and Changing of Speed—Mill Layouts to Utilize Electric Power

BY GORDON FOX*

PRODUCTION of steel, including metallurgical transformation of the raw materials and mechanical configuration of the product, involves largely the application of heat and power. Although the direct cost of power is only about 5 per cent of the total cost of product, it is more nearly 15 per cent of the cost of mill operations. A ton of steel, in the form of billet, plate or sheet bar, involves a total power expenditure

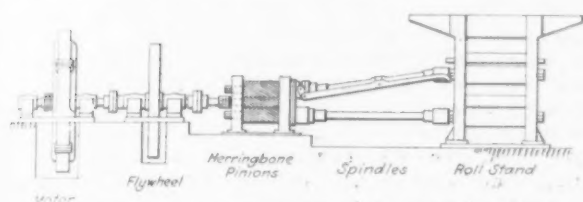


Fig. 1. Lauth Type of Three-High Plate Mill with Motor Drive and Flywheel

of some 200 kw. hr., about half of which is required for blowing at the blast furnace. Due to the large tonnages involved, the cost of power reaches a considerable total expense. In one electrically driven plant producing about 25,000 tons of steel per month, the corresponding electric power cost was about \$40,000. Of greater importance than the direct cost of power

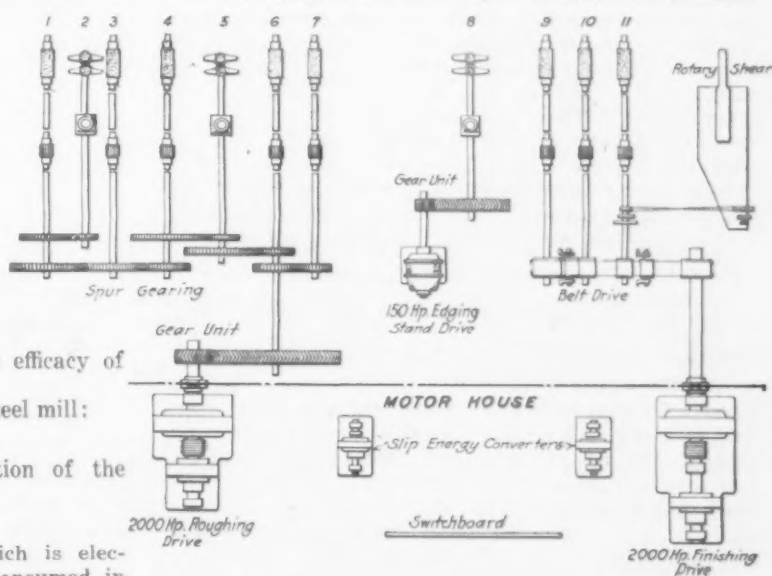
motors must be provided with screws, racks or cranks, and perhaps several gear reductions, introducing complication, cost, space and inertia factors.

Hydraulic drive is well adapted to shears. It is used where the market does not warrant the development of electric equipment, as for revolving ladle cranes. It is also used for counter-balancing, as at main rolls and lifting tables. The principal disadvantages of hydraulic drive are piping expense, inconvenient control, low efficiency, high maintenance costs, freezing and danger from leakage about molten metal. Compressed air is used to a limited extent for minor linear motions and for riveting and chipping.

One of the principal advantages of electric power in the steel mill lies in the fact that it permits centralized generation. The power plant, equipped with efficient condensing turbine generators, occupies a minimum of space and may be located to its best advantage, yet not conflicting with mill layout. Waste heat from blast furnaces may be utilized effectively and completely. The diversity factor between mill demands results in a relatively good load factor on the power house and boiler plant. Duplication of boiler capacity and operating forces is thus minimized. Power can be generated to best advantage on a quantity scale in a central plant.

Electric power can be easily and economically trans-

Fig. 2. Layout of 10-In. Continuous Skelp Mill with Roughing Stands Gear Driven from One Motor and Finishing Stands Belt Driven from Another. Two of the edging mills are driven by gear from the roughing stand drive; the third has a separate motor



is the indirect influence of reliability and efficacy of power application.

Electric motive power is applied in the steel mill:

1. Directly, for rolling.
2. For transportation and manipulation of the steel and adjustment of machinery.
3. For driving accessory apparatus.

Relative usage varies. In a mill which is electrically equipped throughout, the power consumed in rolling is, in general, about 60 per cent of the total, the balance being used by auxiliary and accessory drives.

Power media employed in steel mills are steam, water, compressed air and electricity. Prior to the advent of the electric motor, steam and hydraulic drives were extensively employed for main rolls and auxiliaries, respectively. Most new mills are now equipped with electrically driven main rolls, and the less efficient steam drives are being replaced. Hydraulic power is still retained to some extent for auxiliaries. It has points of advantage, particularly for slow and short linear motions. Hydraulic mechanisms are inherently reciprocating as contrasted with high speed rotation obtained with motors. For linear motions,

mitted in quantity. Protection of the distribution means is readily afforded. Duplicate feeders, loop systems or inter-connection may be employed. Faults are quickly isolated. There are no stand-by power losses at point of application; moving machinery may be readily supplied. The ease of metering electric power permits a ready check on rolling conditions. It permits rolling at maximum safe rates and assists to economies.

The possibilities of purchased electric power are attractive in many instances, either as a main or supplementary source or as a stand-by, particularly for plants in which waste heat is not available. The investment may thus be minimized. Probably the principal deterrent to the more general use of purchased power for steel mills is the experience of lack of reliability. The steel mill power plant compares in reliability and continuity with the central station and enjoys the advantage of contiguity. Transmission interruptions are still of too frequent occurrence with

*Electrical engineer Freyn, Brassert & Co., Chicago. This paper, before the Western Society of Engineers, won the Robert W. Hunt prize for the best discussion of some phase of the steel industry.

some utilities. Power interruptions at a steel mill are always serious and sometimes almost disastrous in their consequences. Interruptions from an outside source are particularly inconvenient because of their indefinite duration.

Probably the greatest advantages of electric drive are derived at the motors. Their compact form, light weight and wide range of characteristics permits their effective application to all classes of main and auxiliary apparatus. Their ease and flexibility of control as to speed, torque, direction of rotation and braking are of preëminent advantage. Their ready subdivision into units as desired assists in simplifying the drives. Their reliability is evidenced by the fact that, in most mills, the electrical delays are few and usually of short

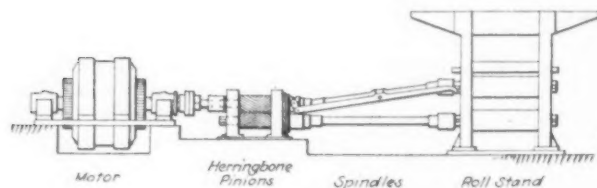


Fig. 3. Reversible Two-High Blooming Mill with Motor Drive

duration. They involve relatively low inspection and maintenance charges. The overall economy from coal pile to the work is comparable or superior to that of other drive media. Motors involve no stand-by losses, and may be started and stopped on short notice. Their uniform torque and speed minimizes mill wear and breakage. Automatic control, with current limiting and protective features, safeguards both the drive and the mill and minimizes dependence upon the operator.

Electric drives for main rolls are available, having a wide range of characteristics. The general type of drive selected depends primarily upon the type of mill and its requirements. There are now installed in the United States and Canada more than 600 main roll motors. These represent a variety of mill arrangements which do not permit of distinct classification. There are, however, some predominating features which render possible a liberal classification of mills from the motor drive viewpoint. Such a classification will be here attempted and the principal features of the various mill types briefly discussed, chiefly as they relate to drive considerations.

Classification of Rolling Mills

Many mills comprise essentially one or more stands or trains of rolls which revolve continuously in one direction. Three-high stands are commonly used, in which the metal is passed forward between the two lower rolls and returned between the two upper rolls. Two or more such stands are often connected in train, that is, with all roll axes in a common vertical plane and with the drive shafts in series, so to speak. The most simple merchant mills are of this type. The last stand in this mill is commonly two-high, as the piece passes through it in one direction only; and better finish can be obtained than in a three-high mill, where the center roll serves double duty.

Some billet mills comprise two or more three-high stands, arranged either in train or in tandem. Rail and structural mills vary in layout, but commonly include three-high trains and tandem sets, which operate continuously in one direction and largely at fixed speeds.

Sheared plate is generally rolled on three-high mills of the Lauth type, the principle of which is shown in Fig. 1. The upper and lower rolls are driven, while the intermediate roll is rotated solely by friction from the roll which backs it up. Both the upper and the intermediate rolls may be raised and lowered. Tilting tables are provided in front and rear of the mills, and two such stands may be used in tandem.

So-called continuous mills comprise a number of two-high stands arranged in tandem, so that the metal passes in a straight line through the stands in sequence. All rolls revolve continuously in one direction. The

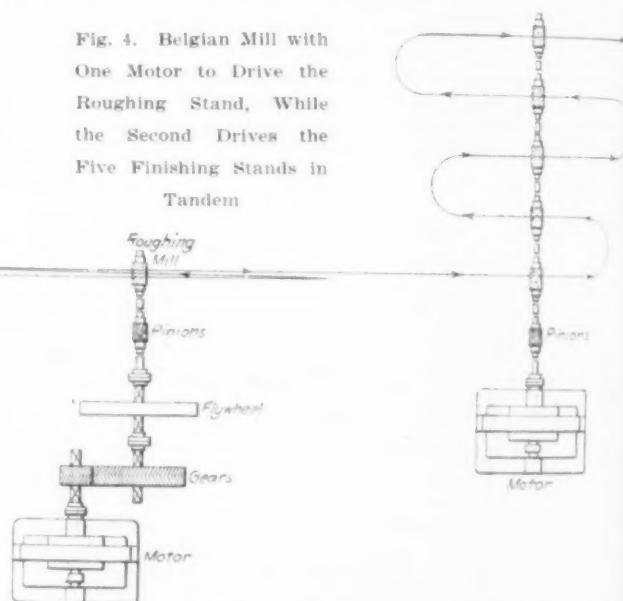
rolls in each successive stand must revolve faster than those in the preceding stand by an amount just sufficient to account for the elongation, and thus prevent or minimize looping. As the delivery speed of a stand is approximately the same as the peripheral speed of the rolls, the intake speed varies in proportion to the draft. Thus, for a 30 per cent reduction in area, intake speed is to exit speed as 70 is to 100. This ratio varies some with different sections.

Some control is possible by adjusting the reduction in each stand. Guides are commonly inserted between stands to skew the metal, so as to work it from all sides, and also to clear the scale. Mills of this type are often divided into groups of stands, usually for roughing and finishing, each group being separately driven. The stands in each group are connected through gearing or belt to the drive. Fig. 2 illustrates a type of continuous mill.

Continuous mills are widely used both for roughing and for producing the simpler shapes. At Gary there is installed a continuous blooming mill having nine stands. This principle is widely used for billet, skelp, sheet bar, strip, merchant and rod mills. The chief advantages of the continuous mill are large production with little labor and rapid reduction with little cooling between passes. The rolls are of short length, and consequently may be of relatively small diameter. This type of mill requires relatively low power per unit of output, due both to the high temperature of working and to the small roll diameters.

The simple reversing mill comprises a single two-high stand of rolls. The lower roll is fixed in eleva-

Fig. 4. Belgian Mill with One Motor to Drive the Roughing Stand, While the Second Drives the Five Finishing Stands in Tandem



tion, while the upper roll may be raised and lowered by a screw acting against a hydraulic balancing cylinder. These rolls are driven through spindles from a pair of pinions, which, in turn, are driven by the engine or motor through a flexible coupling. The metal is passed alternately forward and back between these rolls, which are reversed for each pass. Live tables are located in front and rear of the mill.

Electrically driven blooming mills are almost exclusively of the reversing type. In these mills movable, aligning guards are located above the tables to guide the piece into the proper pass of the main rolls. A manipulating device serves to edge the piece when desired, so that it may be reduced in two dimensions. The general arrangement of such a mill is shown in Fig. 3. The principal application of the simple reversing mill is for roughing ingots. A reversing billet mill has been installed at the Mark Plant of the Steel & Tube Co. of America.

The universal mill is a reversing mill comprising a two-high stand of horizontal rolls, and, in addition, one or two sets of vertical rolls located at the sides of the mill ahead of and/or behind the horizontal rolls. The vertical rolls, which work on the edges of the piece,

and may be moved in and out, are driven through gearing from the main pinions. Universal mills are employed extensively for rolling slabs and universal plate. They are also used for some structural shapes.

The reversing mill enjoys a number of important advantages for breaking down ingots. It is flexible in that both slabs and blooms of various dimensions may be rolled, as ordered, without changing rolls. Due to the absence of lifting or tilting tables, the interval required between passes for manipulating and returning the piece may be made short. The steel may be entered between the rolls slowly, permitting of heavy draft without shock and avoiding slippage. The speed at each pass can be adapted to the length of the piece. The draft is under the control of the operator and can be varied for different steels or for a cold piece, and extra passes may be employed as desired. Due to the absence of lifting tables, the reversing mill as a whole is mechanically simpler than the three-high mill. Although the electric drive equip-

low speed is suitable for roughing work, as the rolls bite better on the heavy drafts and difficulty in entering the billet is avoided. Moreover, the finishing stands may be driven at a higher speed, as they are less compromised by the roughing stand requirements. As several passes are made in the roughing stand of a Belgian mill, this is a limiting factor in production.

One development of the Belgian mill is the combination mill which comprises a roughing mill having several two-high stands in tandem, on the continuous principle. This is followed by two or three

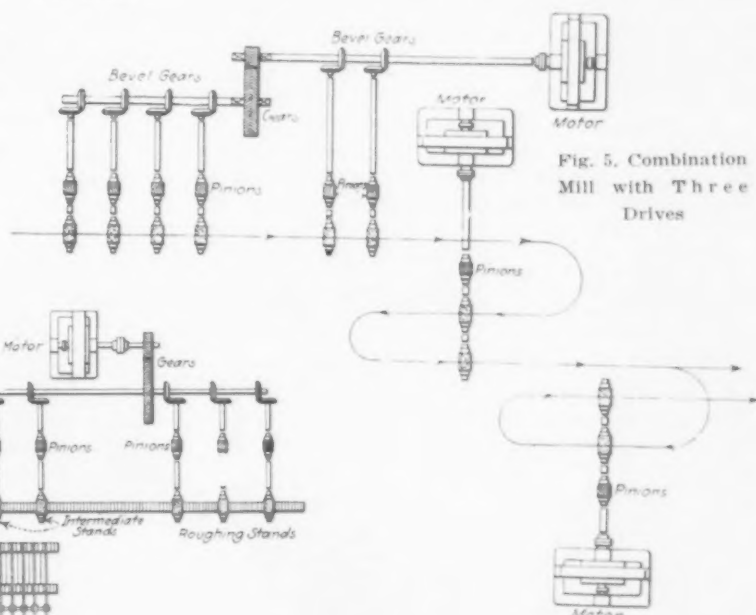


Fig. 5. Combination Mill with Three Drives

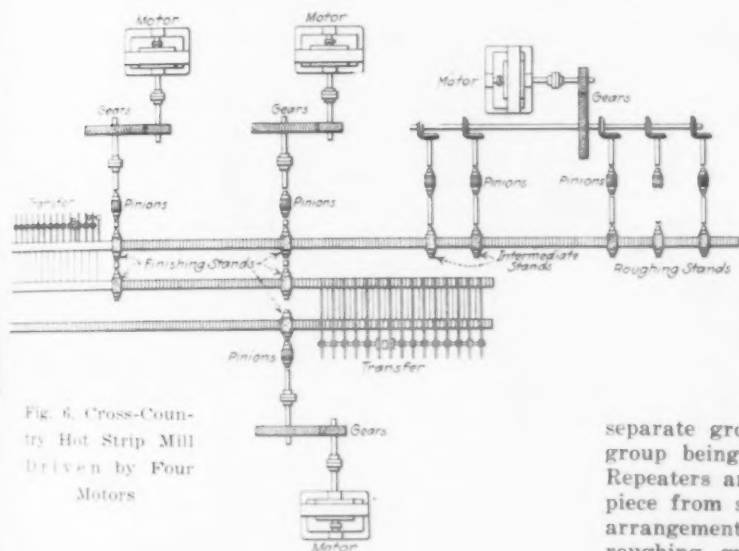


Fig. 6. Cross-Country Hot Strip Mill Driven by Four Motors

ment is more complex, experience has shown that delays from electrical sources are less frequent and usually less serious than mechanical delays, so that additional electrical complexity is warranted by mechanical simplicity.

At the Brier Hill Steel Co. is installed a reversing mill used for roughing plates, which are finished in a three-high mill of the Lauth type. It has been found that this reversing mill is preferable to a three-high roughing mill, particularly as to the short interval between passes. In rolling sheared plate it is necessary to turn the slab 90 deg. after it has been rolled to width in the first passes. It is easier to turn the slab on the fixed tables of the reversing mill than on the lifting tables of the three-high mill. Moreover, it is not necessary to square the piece accurately on the reversing mill, as it can be run against the main rolls and thus squared before the latter are accelerated and the piece entered. It has been suggested driving the three-high plate mill with a motor without flywheel, similar to a reversing motor, which could be stopped between passes when desired, but such a drive has never been installed.

Many mills combine the various types of stands or groups. One of the simpler combinations is the so-called Belgian mill. The single roughing stand of this mill is three-high; the finishing mill contains three-high and two-high stands in train. The piece, usually a billet, is roughed down by several passes in the roughing stand and then entered into the finishing mill and looped from one pass to the next through the various stands. Fig 4 shows the general arrangement of one type of Belgian mill. The advantage of this mill lies in the fact that the roughing stand is driven at a lower speed than the finishing train. A

separate groups of three-high stands in train, each group being separately driven at a different speed. Repeaters are used, at least in part, for guiding the piece from stand to stand. Fig. 5 shows the general arrangement of a combination mill. The continuous roughing group is able to maintain production to fill the finishing mills. The operation of the looping stands at different speeds reduces the length of loops between stands and thus avoids excessive cooling. It maintains the larger sections longer, both due to lower roughing speeds and by permitting more reduction in the later passes. It permits each group to operate at its most suitable speed and prevents restriction of the speed of the finishing rolls, which should be as high as possible.

The cross country mill, Fig. 6, is a combination made up of several stands or trains in tandem, but separated so that the material leaves one before entering another. The piece is carried between stands by live roll tables or transfers. To avoid excessive length of mill the piece may take a zigzag course, reversing its general direction of travel in passing through the various sets. This arrangement of mill usually permits rolling the steel in both directions, which improves its quality. The individual groups or sets may be driven separately or by gear, belt or rope, from a common source. The cross country mill is used to roll products not well adapted, due to size or shape, for continuous or loop mill rolling.

A sheet mill consists of two stands of two-high rolls, one pair being used for roughing, the other for finishing. The rolls revolve continuously in one direction at slow speed. The sheet bars are passed between the rolls by the roller and returned over the top roll by the catcher. The lower roll is at a fixed elevation and is driven. The upper roll revolves solely by friction from the lower roll or the steel and is fed up and down by screws. Several pairs of stands are commonly connected in train and driven by a single motor.

(To be concluded)

Improvements in Heroult Electric Furnace

Copper Pipes Carrying Cooling Water Used Instead of Copper Busses—Transformer Room Underneath the Charging Floor

THERE has been recently installed and placed in operation a 7-ton Heroult electric furnace at the plant of the International Nickel Co. at Huntington, W. Va. Although this furnace embodies the usual features of this type of furnace as manufactured by the American Bridge Co., the design is a new one and there are certain modifications or improvements which are shown in the accompanying illustrations.

The furnace is used for melting and refining Monel metal, which is cast into ingots for subsequent forging and rolling. It has a basic lining and desulphurization and deoxidation are carried on under a basic slag, as

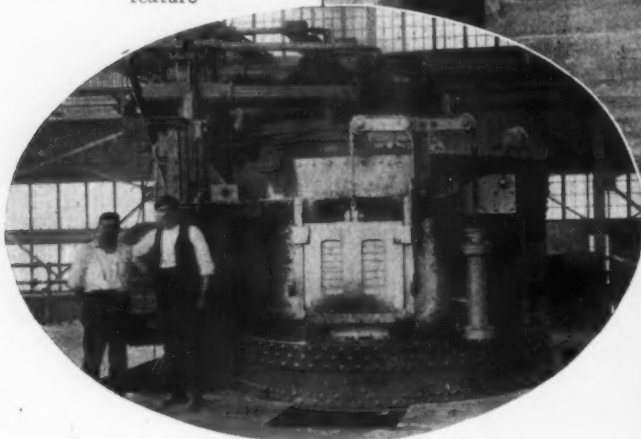
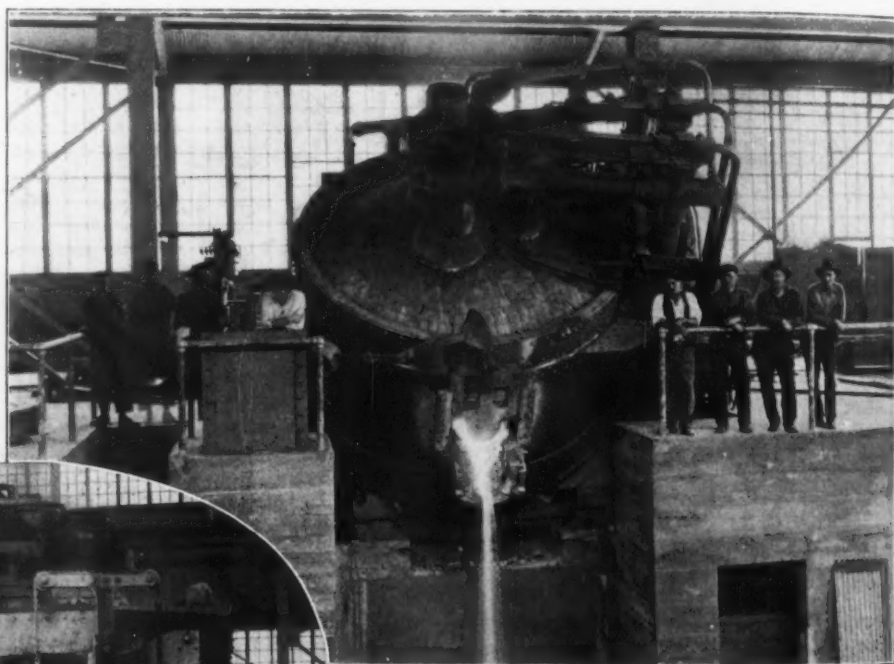
there is a mast made of structural material, used to support the electrode cranes. It was found necessary to carry the conductors over the top of these masts in order to avoid proximity to iron parts with the consequent reactance. This also involved having overhead flexible cables. In the present design the mast is eliminated and the electrode cranes supported from below.

Transformer Room Under the Platform

The relatively small copper pipe conductors can be brought very close to each other, which makes it possible to have longer leads and at the same time have

The Larger Picture Shows the New Type of Heroult Electric Furnace with the Copper Pipes as Conductors Leading Up from the Transformer Room, Situated Under the Platform. The entrance to it is through the door, just below the four men. The illustration just under the door is the transformer room itself

The oval shows the furnace while in operation on Monel metal. The absence of the usual large amount of smoke and gases is considered a feature

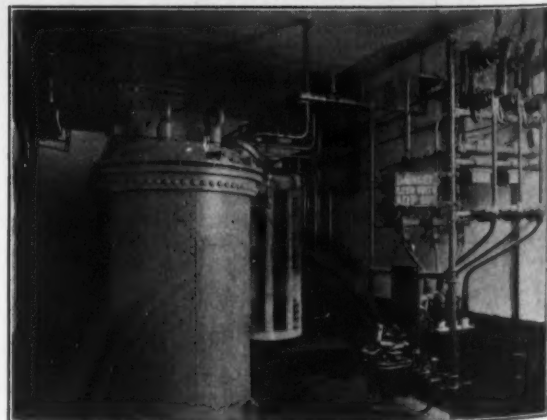


is customary with steel. Practically all heats tapped up to the present time have been as low as 0.005 per cent sulphur.

Copper Pipes as Conductors

Instead of using built-up copper busses the electric current is conducted to the electrodes by means of copper pipes. The pipes also serve to carry water to the electrode holders and to the electrode coolers. For electrical reasons, a hollow circular section is the best one for conducting alternating current, and as the copper is water-cooled, only about one-third as much copper is required as when using busses. This is particularly true when the busses have to be carried over a hot furnace. All designers of electric furnaces have had to contend with the difficulties arising from reactance in furnaces of a large enough size so that the electric current required was considerable; for instance, where the amperes exceeded 7000. The trouble due to reactance is accentuated by having long conductors spread far apart and where the electric conductors pass near or between iron parts.

In most of the familiar types of electric furnaces



them extend beneath the floor. The necessary headroom for the passage of cranes is reduced and no flexible cables or other obstruction surround the furnace, the transformer room being beneath the floor. This arrangement makes it more convenient to have the electrode supporting mechanism attached to the furnace, either at the back opposite to the pouring spout or on the left or right hand side. In the present case this mechanism is placed on the left hand side.

The transformers are 1800 k.v.a. water-cooled. General Electric transformers. The cooling water passes through the transformer and then through the copper pipe conductors, thence to the electrode holders, through a flexible connection and back to the electrode coolers.

The normal operating voltage is 100, although taps are provided to give higher voltages in case the voltage on the high tension line should be below normal. In order to avoid surges on the line and obtain steady operation, it was thought advisable not to have the power factor higher than 0.90 and additional external reactance was provided and is of the type furnished by the General Electric Company, as shown in one of the illustrations.

The cylindrical form of shell was adopted in preference to the dished or bowl shaped bottom, on account of its structural strength. These furnaces were formerly tipped about a hinge on line with the pouring spout and the furnace was provided with counterweights. In the rocker type of furnace the usual type of rocker rolling on a plain surface requires the cylindrical shell to stand too high above the foundation. In the present design, both the casting on which the furnace rolls and the rocker are curved. By thus dividing

the curvature between the two castings the advantage of the rocker type is obtained without having the center of gravity above the rolling center. The furnace tilts backward as well as forward.

The arms carrying the electrodes have been brought in at an angle, for the purpose of placing the electrodes as close as possible to each other and to the center of the furnace. This is important in furnaces of high power, to avoid burning the furnace lining, especially where the basic process is used. The electrodes are actuated by winches and motors attached to the furnace. The General Electric Co. regulator is used. The tilting mechanism consists of two gear wheels on the same shaft, with connecting rods attached to the furnace. The tilting motor is of 15 horsepower.

Although the rated capacity of this furnace is 7 net tons, on account of the weight and compactness of Monel metal, heats of 9 tons are being tapped.

Rocky Mountain Industrial Relations Conference

The second annual conference on human relations in industry, under the management of the industrial department of the Young Men's Christian Association, was held at Association Camp, Estes Park, Col., July 28, 29 and 30. The sessions were attended by several hundred persons, mostly business men and manufacturers from Colorado, Utah, Wyoming, Nebraska, Kansas, Oklahoma, Texas and Montana, with a scattering of visitors from Eastern states. Program and general arrangements were in the hands of A. Bruce Minear, international industrial Y. M. C. A. secretary in the Rocky Mountain region.

The purpose of the conference was to discuss subjects connected with relations of employer, employee and consumer. Addresses, most of them given by men prominent in industrial management, covered various phases of these relations. Besides the prepared talks, there were general discussions in which different points of view were advanced and experiences exchanged.

The industrial relations conference grew out of a small week-end meeting of business men held in connection with the Y. M. C. A. schools at Estes Park in the summer of 1921. At this meeting it was suggested that a more widely attended conference be held in 1922, and that a foreman's course be conducted at one of the Y. M. C. A. schools. Both suggestions were carried out through co-operation between the Y. M. C. A. industrial department and interested business men of the Rocky Mountain district.

The program of the conference follows:

"Progress in Recent Years in Human Relations in Industry," E. H. Weltzel, Pueblo, Col., general manager Colorado Fuel & Iron Co.

"The Three-fold Responsibility of Management to the Parties in Industry," W. C. Coleman, Wichita, Kan., president Coleman Lamp Co.

"Japan's Industrial Future," J. Merle Davis, Tokio, Japan, industrial secretary Y. M. C. A.

"The Training of Men from the Industrial Standpoint," L. A. Gilbert, Denver, manager Swift & Co.

"Confidence and Goodwill," W. L. Petrik, Denver, president Great Western Sugar Co.

"The Public and Industrial Relations," B. B. Brooks, Casper, Wyo., former governor of Wyoming.

"A Program of Health and Recreation in Industry," Dr. Henry F. Kallenberg, Chicago.

Sermon, the Rev. David G. Latshaw, New York.

"The Christian Spirit in Industry," T. W. Currie, professor, University of Texas.

The school for foremen and other business executives, conducted in connection with the industrial relations conference, covered a course of five days, July 24-28, inclusive, with intensive instruction in the following general subjects:

Industrial Leadership, by Fred O. Kelley, Lincoln, Neb., industrial secretary of the Y. M. C. A.

Industrial History and Economics, by E. S. Cowdrick, Denver, industrial engineer.

Industrial Organization, by T. E. Barker, Denver, general superintendent, Denver Rock Drill Mfg. Co.

The Sermon on the Mount as applied to industry, by T. W. Currie, University of Texas.

In addition to the four classes, there was a daily

open forum, led by one of the students, in which subjects of direct interest to industrial executives were thrown open to general discussion. More than forty foremen, superintendents and others were enrolled.

It is planned to make the school for executives and the conference on human relations in industry an annual event, and preliminary arrangements for the 1923 meetings already are under way.

Trend of Wages Over the Depression

Figures of the National Industrial Conference Board for wages covering the period from July, 1914, to January, 1922, show average hourly and weekly earnings, average hours of employment and the ratio obtained by comparing money wages with cost of living. The figures are based on 26 major industries, 3800 industrial establishments and more than 1,000,000 wage earners.

As shown in our table, the average hourly earnings of all wage earners were 98 per cent higher at the end of December, 1921, than in July, 1914. The drop between December, 1920, and December, 1921, was 22.4 per cent. Common labor was 92 per cent higher in December, 1921, than in 1914, but 27.1 per cent lower than in September, 1920. Skilled labor was 98 per cent higher than in 1914, but 20.7 per cent lower than in September, 1920.

Because of shorter working weeks, the average weekly earnings of all wage earners was only 80 per cent higher than in July, 1914, but was 25 per cent lower than in July, 1920. Similarly, common labor was 74 per cent higher than in 1914 and 30.2 per cent lower than in August, 1920. Skilled labor was 80 per cent above the 1914 level and 23.8 per cent below July and August, 1920.

Real wages, meaning the purchasing power of the money wages received, were 11 per cent higher at the beginning of this year than in 1914. In other words, the standard of living had increased to that extent, this resulting from the fact that wages were 80.2 per cent higher and living cost 62.3 per cent higher than in 1914, the excess of wages accounting for the increased real wage or purchasing power. The highest point of real wages during the entire period under survey was reached in October, 1920, with 21 per cent greater real wages than in 1914.

	July, 1914	Peak, 1920	Dec., 1921
Hourly earnings:			
All wage earners..	24.3c.	a 62.1c.	48.2c.
Common labor.....	20.7	b 54.6	39.8
Skilled labor, male	28.0	b 70.0	55.5
Women	15.6	c 41.7	34.7
Weekly earnings:			
All wage earners..	\$12.36	d \$29.69	\$22.27
Common labor.....	10.89	e 27.14	18.95
Skilled labor, male	14.19	d 32.64	25.66
Women	7.82	c 18.79	15.76
Hours per week:			
Average nominal..	55.1	c 50.7	49.8
Plant activity	53.8	e 49.3	47.2
Per wage earner..	51.0	c 48.5	46.2
Index number:			
Wages, weekly....	100	d 240.0	180.2
Cost of living.....	100	d 204.5	162.3
Real wages.....	100	f 121.0	111.0

a—December. b—September. c—June. d—July. e—August. f—October; July showed 117.

Core Box for Making Sash-Weight Cores

A patented combination core box for use in connection with end-drawn sash weight flasks, and which together form a special system of making sash weights, is being offered by the De Ved Brothers, Inc., Baltimore. This system is intended to permit the production of sash weights in large tonnage at very low cost, with a smooth eye and plainly marked.

The core produced by the box is in the form of a plug adapted to close the top of the sand mold in which the weight is cast, forming the eye which receives the sash cord, and incidentally forming the entire top of the weight.

The core box is made up of two side members pivoted to open and close in a tongwise manner. These members are pivoted to a base as shown in the illustration. Holes or pockets are formed by registering cavities in the opposed members, the two cavities forming cylindrical opening when the members are swung closed. A center detachable bar, located parallel to the axis of the swinging members, extends through the pockets and forms the eyes in the respective plugs.

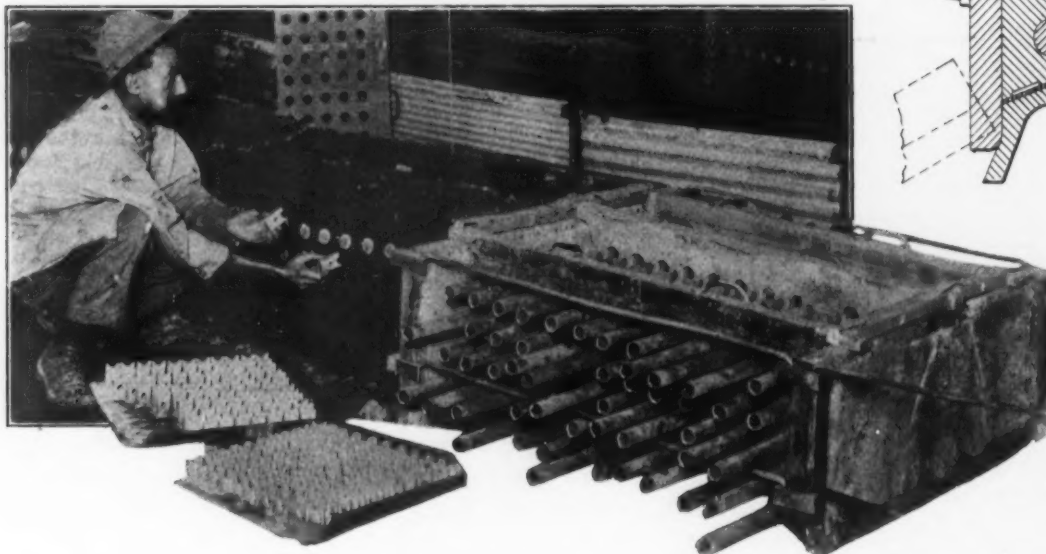
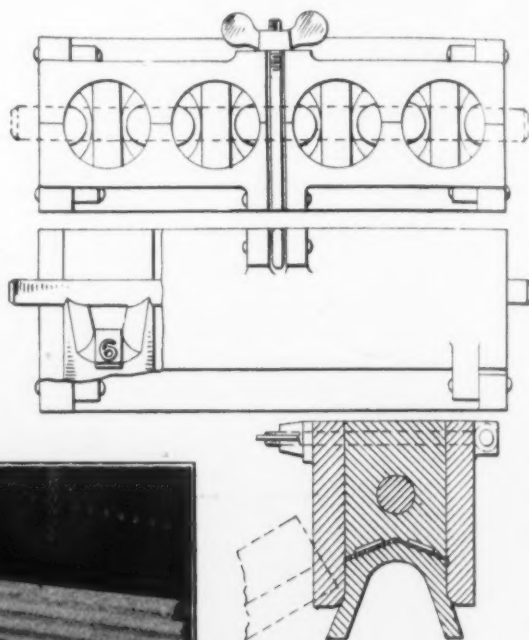
To shape the core to form the top ends of the weights the base member is provided with upright projections spaced to correspond with the pockets. One projection closes and forms the bottom of the pocket when the swinging members of the core box are brought together, bringing the corresponding semi-circular cavities together to complete the formation of the pockets. These projections are also used to support the number plate.

In the system as a whole, which the company is ready to lease to interested parties, what are called

Electric Alloy-Atlas Crucible Merger

President L. J. Campbell of the Electric Alloy Steel Co., Youngstown, Ohio, announces that the merger of this property with the Atlas Crucible Steel Co., Dunkirk, N. Y., is virtually completed. Consummation of the consolidation may be expected very shortly, he states. Mr. Campbell will be chairman of the board and chief executive officer, located at Dunkirk. To unify management, leading directors of the Electric Alloy company have been added to the board of the Atlas Crucible Steel Co., including James A. Campbell, Thomas J. Bray, W. A. Thomas and L. J. Campbell.

As far as possible the properties will be operated as a single unit until the merger details are actually completed, in order to get the advantages of operating



Core Box for Making Sash-Weight Cores. Top plan, side and end elevations are shown above. The end-drawn flasks and placing of cores are shown at left

end-drawn flasks are used. These are 4 ft. long, 4 ft. wide and 18 in. high and contain 120 sash weights to the flask, or from 800 to 1000 lb. of iron. It is claimed that one laborer can put up 10 to 12 of these flasks per day, making 8000 to 12,000 lb. of sash weights and that experienced molders are not necessary to perform this molding, common labor being said to be adequate for the process.

With the combination core box described it is claimed that the cores for the flasks can be made by a boy at the rate of 500 per hr. It is figured that the cost of molding and of making the cores is one dollar per ton, the flasks now up, ready for the hot iron. A very cheap grade of melting scrap and also very low grade of scrap such as roofing tin, sheet metal clippings, etc., can be used in this system.

The company recommends the system to all foundries to be worked in with other general foundry work, it being emphasized that this system permits a foundry to produce sash weights for local requirements at a saving in freight and handling expense and permits of quick delivery to nearby consumers.

economies which will thereby be effected. A temporary working arrangement, with Mr. Campbell in charge, is therefore in effect until legal consummation of the merger is completed.

Permits were issued in Chicago in July for 1144 buildings, fronting 33,075 ft. and involving a total cost of \$16,214,300 as against 754 permits for structures fronting 21,403 ft. and costing \$14,004,650 in July, 1921, an increase of 390 permits, 11,671 ft. of frontage and \$2,209,650 in cost. The figures, however, show a decrease as compared with June, 1922, of 275 permits, 8744 ft. of frontage and \$10,362,550. Figures for the first seven months of 1922, showing 7569 permits, 233,960 ft. of frontage and a cost of \$127,716,610, are greatly in excess of the records for the same months in previous years as far back as and including 1913.

The United Coke & Coal Co., seller of foundry, furnace and domestic coke and coal, has moved its offices from 2013 to 814 Fisher Building, Chicago.

Notes on Acid Electric Furnace Practice*

Basic Scrap and How to Charge It—Making a New Bottom —When to Tap and How to Pour—Alloy Additions in the Furnace

BY CHARLES WELLMAN FRANCIS

ACID practice is the most universally used in the present day foundry for the manufacture of steel castings. This fact was probably due largely to the recent world war conditions which brought about a great scarcity of Austrian magnesite in this country, magnesite being the best of all basic refractories, and has caused the development of our own American product to such an extent that we have pretty closely approached the qualities of the Old World material which we at one time thought could not be equaled. Again, production was the first word in the American steel industry during this period, and acid practice is the fastest and most economical when ordinary physical and chemical specifications only are to be met. As a result, one great difficulty has arisen which may tend to swing us back more generally to basic operation, namely, that our scrap as a product of the acid-lined furnace has gradually become more impure in quality, due to no refining. Also during this reconstruction period, competition has become much keener, which will tend to the manufacture of finer grades of steel.

Basic Scrap for Acid Furnaces

As has been mentioned in one of the previous articles, the writer has found it advisable to use a good basic scrap for charging the acid furnace. This scrap should be of a light, quick melting, shoveling type, and yet have body enough to prevent the electrodes from quickly penetrating it and striking the furnace bottom. To help prevent the latter occurring, the foundry scrap portion of the charge, which usually makes up 40 to 50 per cent of the melt, is first placed on the bottom of the furnace with the purchased scrap on top, taking care to prevent the piling of the scrap against the side walls and banks as much as possible.

There is a double reason for piling the scrap in the center of the furnace as much as possible and consequently keeping it off the banks and side walls unnecessarily. First, when it is piled in a heap in the center of the furnace it will be the melting zone of the electrodes, which tends to enhance quick melting. Second, a great amount of unnecessary labor is done away with because this scrap clings to the side walls and banks and must be pulled into the bath when the furnace is hot. Of course, some of this work always has to be done, no matter how carefully the furnace is charged, but it is advisable to eliminate hot and heavy work wherever possible. It is important to emphasize here that the rate of melting is solely dependent on the manner in which the furnace is charged and how the current is applied.

When the charge is entirely melted a test is taken and broken for a fracture reading by the melter; one portion of the test piece is then drilled and sent to the laboratory for analysis. According to the result of the analysis, the necessary amount of ferroalloys is added as soon as the metal is hot enough to pour. No slag mixture is added during the acid electric furnace heat, as the impurities in the scrap, together with the wash-

ings from the banks and side walls, form sufficient slag. Often an acid heat will melt practically free of slag, but from the time the charge is entirely melted until the heat is ready to be tapped, the slag will accumulate rapidly. An acid heat should be tapped when the slag bubbles and becomes puffy, which is often termed a "dry" slag.

When the heat is tapped the furnace is ready for fettling or repairing. This work depends entirely on the condition of the furnace bottom and banks, and requires considerable experience to be done properly. Ground ganister is used and sometimes it is mixed with silica sand, depending on the conditions of the furnace. This material is usually wet thoroughly, because the wet mixture can be more accurately thrown from a shovel to the desired point in the furnace. Also because the wet mass will not spread as will dry fettling material when thrown from the shovel. Inexperience in doing this work is usually illustrated by the building up of the furnace bottom or the rapid disappearance of the banks, caused by using too much bottom mixture or not enough, respectively. Great care must be taken in repairing a "hole" which is sometimes left in the banks or bottom after a heat is tapped. In doing this the same methods are employed as are used in open-hearth furnace practice. If the hole is small the hot metal which stays pocketed therein can generally be balled on the end of a cold rabble or hook and pulled out. If the hole is larger the use of a little silica sand will help the operation considerably.

After making bottom, as the above operation is commonly termed by steel melters, it is advisable to close the furnace doors and let stand for a few minutes, as the intense heat of the furnace will cause the new repairs to set into place, and consequently it will not be so easily displaced by charging the foundry scrap.

Burning in a New Bottom

Burning in a new furnace bottom is one of the most important features in any type of furnace practice. Methods used in the electric furnace differ considerably from those used in open-hearth furnace work. Ground ganister, silica "grits," silica sand and fire clay are used in the proper proportion to form a somewhat plastic mixture, and the entire bottom is put in place in one operation with the use of a foundry air rammer, and smoothed off to the desired contour. The bottom should then be dried thoroughly with a wood fire from 24 to 48 hr., after which the furnace is dumped to remove the ashes and a bed of coke is distributed evenly over the bottom. The electrodes are lowered and the power turned on as low as possible. Four to six hours of burning, with the power on and off intermittently, is often sufficient to give the bottom the necessary baking, prior to charging the furnace. The furnace will gradually become hotter under these conditions, and it will be found advisable to leave the power on for shorter periods.

After the furnace has been well heated it will be found that these periods during which the power is shut off will give as good results as those during which the power is on, provided the furnace doors are kept closed and sealed, for the new furnace will be getting

*In the issue of July 27, p. 201, the author discussed the choice of an electric furnace and in the issue of Aug. 3, p. 277, the economy features of electric foundry design and equipment.

the desired soaking. It is surprising how quickly the empty furnace will be heated; consequently great care must be exercised not to carry this work on too quickly or a "dripping" of the roof and side walls will take place, greatly diminishing the life of the refractories.

Tapping and Pouring

The remaining phase of this problem which the author wishes to discuss briefly is the tapping and pouring of an acid heat. Considerable controversy arises at times whether to use bottom-pour or lip-pour ladles. For acid heats of three tons capacity or smaller, the lip-pour ladle will be far more economical in the long run because, aside from being much easier to handle, they will last for six to eight heats without being relined other than knocking off large particles of slag and repairing the lip. On the other hand, the bottom-pour ladle for small heats produces considerable distress in a small shop, due to the delays experienced in "setting stopper," to say nothing of the probability of losing a large part of the molten metal in the furnace pit. Just as much care must be exercised in setting the stopper in a small ladle as must be employed in an 80-ton open-hearth ladle.

All the metal should be tapped into a big ladle at once so that the furnace can be given the proper care immediately, instead of being "shanked" from the furnace, as is often done with the smaller size furnaces. Considerable electric power is also saved by getting

the furnace charged again as quickly as possible, and analogous to this same principle is the fact that if work is slack in the foundry it is more economical to start the furnace later in the day and take the necessary heats one right after another until the floor is cleared, provided no overtime is necessary.

Alloy Additions

There is no general method which is universally followed by electric steel makers in making the alloy additions. Some foundries make their final additions in the ladle, some in the furnace, while other split them half and half, still others adding manganese in the furnace and silicon in the ladle and vice-versa.

There is an old saying among certain open-hearth melters that "the proper place to make the steel is in the furnace." The author is of the opinion that this statement is not far wrong. It has been his personal experience that the best method is as follows: When the heat is ready to be tapped, call for the ladle, and while the ladle is being brought up to position make the necessary additions of ferromanganese and ferrosilicon in the furnace, give the bath a good stirring and tap the heat at once. This method will give the best mixture and uniformity of analysis, and the melter can be reasonably sure that he will get all that he adds, while on the other hand alloy additions in the ladle often cause hard spots, poor mixture and low analysis, especially when the slag is a little "stiff."

Large Hydraulic Flanging Press

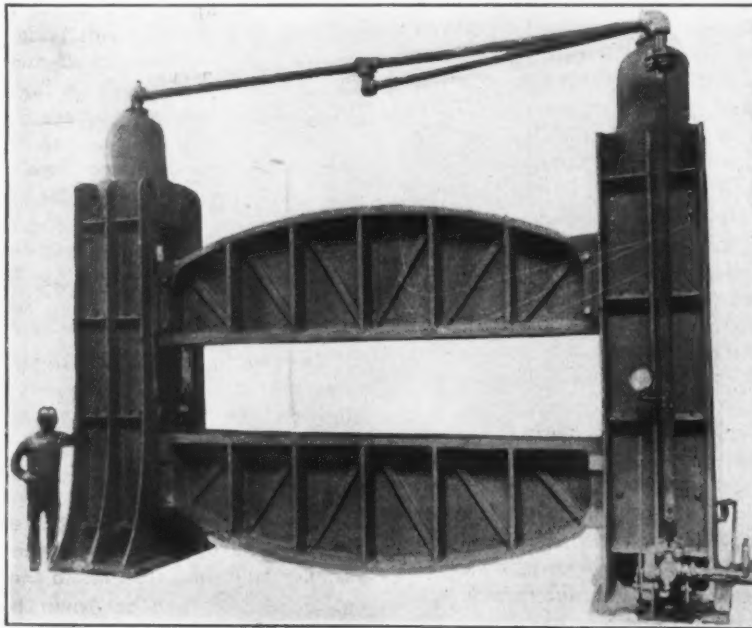
A hydraulic flanging press, the total weight of which is 42 tons, and capable of exerting a maximum pressure of 435 tons, is shown in the accompanying illustration.

It was built recently by the Hydraulic Press Mfg. Co., Mount Gilead, Ohio, for the Merchants Dispatch Transportation Co., Rochester, N. Y., and is used for flanging the plates for Murphy car ends.

The machine will flange cold steel $5/16$ in. thick and 10 ft. long. It has a stroke of 24 in., and the maximum distance between platens, daylight space, is 36 in. The two rams are 20 in. in size and located as shown. Two $5\frac{1}{2}$ in. auxiliary cylinders

are used for returning the platen. A three-way poppet-type H-P-M high-pressure hydraulic valve controls the movements of the press, the valve being manipulated by one hand lever. The cylinders, platens, housings and other parts of the machine are of cast steel and in connecting up the press H-P-M hydraulic valves and fittings were used.

This equipment is said to be the largest that has ever gone through the Hydraulic Press company's shop, although many presses of higher tonnage have been built. The height and massiveness of the machine may be judged from the size of the workman standing beside it.



Flanging Press Used for Plates for Murphy Car Ends. It weighs 42 tons and exerts a pressure of 435 tons

Employment in July

WASHINGTON, Aug. 8.—Of the 65 leading cities of the country, 44 report employment increases, according to the industrial analysis of the Department of Labor for July.

"Throughout the country," says the report, "a strong undercurrent in the direction of an industrial recovery is evident, notwithstanding difficulties incident to lack of fuel and transportation. Evidence of this is found in decided increases in 10 of 14 basic industries. The iron and steel industry in some sections suffered keenly through inadequate fuel supply, yet employment registered a material increase. A more substantial increase was shown in the metals and

metal products other than iron and steel."

The report further points out that the increase in building operations approaches a boom in many sections of the country. "A thorough canvass of the industrial situation," says the report, "reveals an optimistic opinion that the country, with the settlement of the two major controversies, will experience a rapid advance in industrial prosperity."

The Cedar Rapids Foundry & Machine Co., Cedar Rapids, Iowa, has filed an admission of insolvency in answer to an involuntary bankruptcy petition by several of its creditors.

Let Steel User and Steel Maker Co-operate*

Experiences with Steel in Cement Plant Machinery Show How Failures Might Have Been Avoided— Importance of Heat Treatment

BY W. R. SHIMER

It was my original intention to present a paper containing definite recommendations for the more important iron and steel parts used in machinery for the manufacture of cement. Upon going into this phase of the subject in detail I find that, due to various local conditions, a steel which is satisfactory for a certain part at cement plant A may not be suitable for the same part at cement plant B. This is due to various reasons, such as difference in hardness of rock, type of machinery, condition of machinery, personnel of operators of machinery, etc. I will, therefore, confine myself to general remarks and attempt to show how to obtain steel which will best suit the purpose and how to draw up specifications which will assure a satisfactory product.

From an examination of certain failed parts there is every indication that some of the failures can be attributed to error in design. For example, the writer had the opportunity to investigate the breakage of shafts in an electrically operated shovel operated in the same quarry with two steam shovels. No shafts were known to break in either of the steam shovels, while the shaft breakages in the electric shovel were frequent.

When the electric shovel was attempting to dig out the side of a hill in one scoop—and since an electric motor will withstand a 100 per cent overload momentarily—the shafts were stressed to double the amount for which they were designed, and as this stress was a sudden one, the shafts naturally twisted off. I understand that when a steam shovel is overstressed it will stall; there are no sudden shocks, and consequently shaft failures are much less frequent in shovels of this type.

The shafts in the electric shovel could not be made larger without making radical changes throughout the entire mechanism, and it was necessary, therefore, to use a special nickel chrome steel, heat treated to give more than twice the elastic limit of the original shafts, and at the same time the elongation and the contraction of area had to be fairly high to insure sufficient ductility to withstand the usual shock and vibration. The physical properties of the failed shafts showed approximately the following:

Tensile strength	62,000
Elastic limit	32,000
Elongation, per cent.	35.5
Contraction of area, per cent.	61.07

The heat treated alloy steel shafts showed:

Tensile strength	112,000
Elastic limit	90,000
Elongation, per cent.	22.5
Contraction of area, per cent.	64.0

These physical properties more than make up for the deficiency in the size of the shaft.

The Use of Cold Drawn Steel

For quick repairs, cold drawn shafting was used for shafts in this shovel, and some broke in one week's time. Cold drawn steel is made by pickling all the scale from the hot rolled bar, which is then pulled through a die 1/32 to 1/16 in. less in diameter than the original bar. This produces a bar of accurate size, with a smooth, bright finish. The bar is reduced cold and while cold extends in length in proportion to the amount of reduction in cross section. Low carbon steel is cold drawn without annealing, but the higher carbon and alloy steels are annealed first. The physical effect of this cold working is to raise the elastic limit in the

smaller diameters up to approximately 90 per cent of the ultimate tensile strength, with a corresponding decrease in ductility. Prior to cold drawing, the elastic limit of the same steel approximates 50 per cent of the tensile strength, with considerable ductility.

I would not recommend that cold drawn steel be used for important structural parts which must withstand shock and vibration. It is an excellent steel for screw stock, bushings, sockets and parts of this nature which must be turned out cheaply by the thousands on automatics. It is satisfactory for line shafts and other parts of like nature which are not highly stressed. Some years ago an automobile company in an attempt to save money on lathe work, used for a time a cold drawn alloy steel for axles. They were drawn to finished size, and all the machining required was to cut to length and mill the ends square. This proved an expensive economy, as these axles failed in many of the cars after short service and replacements were made free of charge in order to satisfy the car owners. The replacing axles were made of a special heat-treated alloy steel, and they returned to the practice of turning the bars on a lathe rather than to obtain the accurate size by cold drawing.

Cold drawn steel has its field, and I do not wish to be misunderstood in my remarks concerning it. It is, however, false economy to use it for highly stressed parts, as there are so many steels which can be heat-treated to stand up under severe service and which will far outlive cold drawn steel.

Improper Heat Treatment

Many parts fail in cement machinery on account of not being heat-treated, or having been improperly heat treated for the service to be performed. Many times steel of correct composition for a certain use fails in a very short time because of improper heat treatment. When properly heat-treated this same steel will give satisfactory service. We received an order some years ago for ten bars of nickel steel 4 in. in diameter. This order was from a drop forge concern and from the composition of the steel ordered it was inferred that the steel was to be cut up and forged into gear blanks, which subsequently were to be heat-treated. This steel was shipped to the customer in its annealed condition, having been annealed for machinability. A short time later we received a complaint, stating they had made piston rods from three of these bars and put them in drop forge hammers. One lasted 2 1/2 hours and broke; another lasted 5 1/2 hours, and the third lasted about 15 hours. They stated that this so-called high grade nickel steel was inferior to brass or wrought iron. The remaining seven bars were returned and given a special heat treatment by quenching in oil, with subsequent annealing. They were returned to the customer and were found to be entirely satisfactory. In order to obtain the best service from alloy steels, they must be heat treated, as it is not good economy to use them otherwise. When heat treated they are far superior to ordinary steels.

Experiences with Steel Castings

Proper attention is not always given to steel castings, due in part, perhaps, to the users feeling that because the casting was made of steel instead of iron it had all the strength that was required, with the result that no check was made as to the analysis of the steel or to its annealing. This applies, of course, to commercial castings. There have come to my attention quite a few failures of machines where steel castings

*From a paper before the Atlantic City meeting of the Portland Cement Association, June 27, 1922. Mr. Shimer is sales metallurgist of the Bethlehem Steel Co., Bethlehem, Pa.

have been used, the machines in mind being large jaw crushers.

Up to a few years ago, the primary crusher was fitted with a jaw opening of about 24 by 36 in. but with the advent of steam shovels it became necessary to increase the size of crushers, and these machines are now built with openings up to 5½ by 7 ft.

In the designing of these larger size crushers, the manufacturers went to the use of steel and made a great many of the crushers in sectional design, i.e., the side frames and end frames being separate castings, machined and held together by turned bolts.

Another design of crusher consists of a "semi-steel" frame, reinforced with a cast steel band which is shrunk around the bottom of the frame and a cast steel band around the top. The design is such that the steel bands take all of the crushing strain.

The failures of these steel crushers have been due partly to incorrect analysis of the steel and partly to the fact that the castings had not been properly annealed, if annealed at all. In one of the large plants there was broken in operation a crusher in which the frame was 20 ft. long and the cross section of the steel about 6 in. by 5½ ft.

The breakage of these castings showed that the steel was very coarse grained and that it had not been properly annealed, with the result that original strains were still in the castings. Had these castings been properly annealed, there is no question that the machine would have stood up and that the breakage would not have occurred. The repairs to this particular machine will cost the operating company many thousands of dollars, as the machine will first have to be banded together to permit it to continue to operate, and later the side frames entirely replaced with new castings.

There has also been brought to my attention the failure of a crusher which was reinforced with a heavy steel band. This band was of oval shape and had a wall cross section of 5 by 24 in. It broke at three points almost simultaneously, and the nature of the breaks indicated brittleness. Investigation showed that the casting was too high in carbon and that it had not been properly annealed. The microscope showed a structure of steel in the same condition as when cast; if it had been annealed at all, it only went through the motions of this operation, as there was no indication of annealing from the examination of the casting itself.

Customary Specifications and Tests

The practice generally followed is to specify certain physical properties in accordance with the specifications of the American Society for Testing Materials. The tests are taken from coupons attached to the casting, and heat-treated with the casting. Test coupons are integral with the casting. They should not be broken from the casting until it has been heat treated. If, by accident, the coupons should be broken off prior to annealing, they should not be heat treated separately but should be charged in the same annealing furnace at the same time with the casting in order that it receive identical heat treatment with same. This is necessary in order to be assured that the physical results obtained from the coupon represent the physical properties of the casting itself.

Failures such as those just briefly cited might mislead prospective purchasers into believing the machinery itself was at fault. In cases of this kind, no reflection can be cast upon the make or design, because the failures are directly due to the fact that the makers of the castings did not furnish a good product. It is always unwise to place an order for a special part to the lowest or any bidder, without first having been satisfied as to his ability to furnish a satisfactory product.

I believe I am safe in stating that the average mechanical engineer knows steel only in a general way, as he has neither the time nor the opportunity to keep up to date with the rapid advances made in this art. Even we who are working on this subject all the time find it difficult to keep pace. An engineer will design a part and figure on a certain factor of safety, for example of 5 to 1, when he expects to encounter shocks, etc. With this factor of safety, he may require steel

of, say, 110,000 lb. elastic limit, which predetermines an ultimate strength of approximately 140,000 lb., but loses sight of the fact that to meet this high elastic limit, the elongation and contraction will be relatively low, and he will have a steel lacking in ductility, so that the real factor of safety is actually much lower. For such a highly stressed part, he would have a more satisfactory product if he used a factor of safety of 4 to 1, and asked for a steel having, say, 90,000 lb. elastic limit, with proportionately lower tensile strength, since he would have a corresponding increase in ductility, thereby enabling the part to withstand shock and vibration.

Importance of Ductility

One big problem in some cement plants is to obtain satisfactory shafts for gyratory crushers. Low to high carbon steels and alloy steels heat treated for high tensile strength and elastic limit have been used, but certain plants still have more breakages than they should. I have been investigating this subject with a view to developing a satisfactory steel and a heat treatment for this purpose. In general, I find the tensile properties need not be high, but the important properties are elongation and contraction of area. The shafts which on the average stand up longest in service are those with greatest ductility.

I have interviewed a number of cement plant operators who use the gyratory crushers and find such shaft failures are peculiar to certain plants, while others rarely if ever have this trouble. The plants which have no failures attribute their success to the fact that they make a special effort to keep dipper teeth, sledge hammers, and other iron and steel parts from going through the crusher. The penalty to employees allowing such parts to go through is dismissal. I am inclined to believe that this is one of the major reasons for shaft breakages, as this would explain why the harder shafts are more susceptible to failure than the softer and more ductile ones.

When a large piece of steel passes through a crusher, something has to give, as the crusher itself cannot stall. If the liner plates do not break, the shaft must distort. A hard shaft will act as a spring, but the excessive strain which has been put on some points, usually on the outside surface, will produce a nick of perhaps microscopic size, which we might call an incipient break, and during continued service it grows larger, finally resulting in the fatigue break, which these shafts manifest on fracture. The softer steel shafts will bend and at times even take a permanent set, but there is no doubt but that the increased ductility accounts for their being longer lived. When a plant has an unusual number of breakages of this nature, and if it is certain no foreign material has gone through the crusher, an investigation should be made by a competent party, as such a condition can generally be corrected either by a change of steel or by special heat treatment.

I understand some gyratory crushers are being redesigned in order to permit shortening of these shafts, and that these shorter shafts are reducing the breakages to a considerable extent.

Buyers Need to Know Steels

I can easily imagine how the cement plant engineer, or the engineer building machinery, who might interview six to a dozen representatives from as many different steel concerns, could become confused when attempting to boil down the diversified information received. The same thing would happen if the writer were in the market for cement, and with his limited knowledge of this product would have difficulty deciding whose cement was best after interviewing representatives from as many cement companies. I would probably purchase from the lowest bidder, and no doubt obtain just what I paid for, namely, an inferior product. The enthusiastic steel salesman may elaborate on the wonderful physical properties of a special alloy steel, representing results obtained from a small test bar, and leave the cement engineer to believe that

(Continued on page 388)

Detroit Facing a Serious Fuel Situation

Many Iron, Steel and Other Plants Have Nearly Exhausted Their Supplies—The Detroit Employment Curve in 1920-22—Some Signs of Slackening

(Editorial Correspondence)

DETROIT, Aug. 5.—The labor situation is uppermost in the minds of manufacturers everywhere and Detroit is no exception to the rule, for there is grave apprehension here as to what will happen to the industries of this city within a very short time unless both the railroad and coal strikes are settled. Detroit is so located that in times of congestion on the railroads the coal shortage is likely to become very serious and to-day many plants have almost exhausted their supplies of

plies of coal within a few days it will be necessary for them to curtail their service.

Employment in 1920-1922

The accompanying chart, compiled by the Employers' Association of Detroit from reports of the number of employees submitted each week by 79 firms whose employing strength includes approximately two-thirds of the working population of Detroit, shows that in

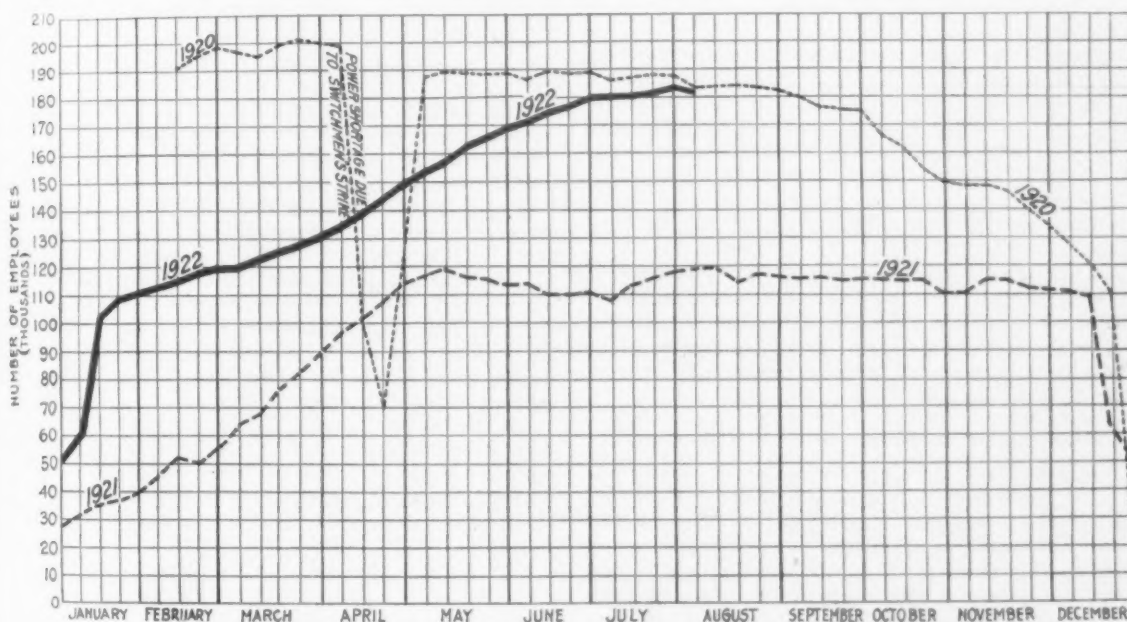


Chart Showing Number of Employees in Detroit Plants from February, 1920, to Aug. 5, 1922

coal. The Ford Motor Co. announces that its supply will last but 14 days, and it has made a strong appeal for priority in the shipment of coal to its plants, not only on its own account, but because other industries are dependent upon it.

If the great Ford plants are closed, many foundries and other plants will be thrown into idleness. Detroit's chief hope for relief rested upon the ability of Henry Ford to make an arrangement so that his railroad, the Detroit, Toledo & Ironton, would be able to carry coal from the Kentucky fields to Detroit. The Louisville & Nashville some time ago declined to enter into such an arrangement with the Ford line, and another appeal made this week was likewise declined to-day. There are 6000 cars loaded with coal at Corbin, Ky., and if a way can be found to deliver this coal to Detroit, relief will be afforded, but no plan for this is now under consideration.

A representative of the Semet-Solvay Co., on which the Detroit Iron & Steel Co., public utilities and many industries depend for coke, told me yesterday that unless there is a decided change for the better next week the company will be compelled to cease operations within 12 days. He said that no coal is being received now and that within two weeks it would not have more than enough on hand to keep the by-product ovens warm. Representatives of public utilities, including the electric light company, say that unless they obtain larger sup-

plies of coal within a few days it will be necessary for them to curtail their service.

1920 nearly 200,000 men were employed until early in April, when, owing to the switchmen's strike, the number rapidly declined to about 70,000 and then advanced quickly to 190,000 about the middle of May, continuing without much decline until the first of August. Then came the slump which resulted in only about 25,000 men being employed at the close of the year. In 1921 the number of employees increased steadily from 25,000 in January until it touched nearly 120,000 in May, and continued with little change until about Dec. 15, when there was a sharp decline to about 50,000 men. In 1922, the change for the better started immediately after the first of the year and continued until Aug. 1, when nearly 185,000 men were busily engaged.

This week, for the first time in months, the number of employed has declined and this fact has been viewed with some apprehension by a few observers, but it would be indeed surprising if some men were not thrown out of work at the present time and the best informed observers say that the showing of the past week is indeed remarkably favorable. What will happen in another week is problematical. There may be a decrease in employment like that of April, 1920, since there is a shortage of not only coal but of pig iron and other raw materials. Numerous foundries are on the verge of shutting down, at least temporarily, and Detroit furnace operators are at their wits' end trying to devise means of keeping the foundries supplied with

iron. Prices have advanced in harmony with the advances in other cities, but this fact does not deter foundrymen from placing orders when they are able to do so.

Satisfactory Industrial Relations

Except for the troubles which have arisen from the coal and railroad strikes, Detroit is enjoying very satisfactory relations of employers and employees. At one time last year there were 40,000 idle men in this city. Within a few months, virtually all of those men who wanted work were employed and in addition 60,000 other men have been added to the payrolls. All of this has been done without serious friction. There have been no strikes and labor has been well paid.

Detroit Iron & Steel Co. Operations

The one active blast furnace of the Detroit Iron & Steel Co. has been almost the sole reliance of many malleable and gray iron foundries for some time past. It has been running on malleable recently and goes on foundry to-day. A visit to the plant on Zug Island shows that the other stack, which was put out of commission by a serious explosion last winter, has been placed in repair and is in fine condition to resume, but owing to the coal and railroad strikes no definite date has been set.

Standing on the dock, one can see the modern equipment of the company, designed for handling a large amount of ore which must be transferred to barges for shipment up the River Rouge to the Ford blast furnaces. Fully 300,000 tons will be moved before Nov. 1. At another point on the river ore sold to the Ford company by Clement K. Quinn is being loaded on barges. His contract calls for the delivery of over 200,000 tons this season.

Across the river, one sees the two nearly completed furnaces of the Canadian Steel Corporation at Ojibway. The ore dock at Ojibway has been completed, but the blowing engines have not been installed and it probably will be a number of months before any iron is made by this subsidiary of the Steel Corporation.

Data for the Steel Institute Committee

An immense amount of information is being collected at a number of points in the Central West for the use of the committee appointed last May by the American Iron and Steel Institute to consider plans for reducing the hours of labor in the steel plants of the country. Many clerks are engaged in collecting the data, which will consist not only of statistics but also of opinions of superintendents and others who have had practical experience in steel plants.

There is a strong feeling, however, that the present is not opportune for the introduction of the eight-hour day, on account of the shortage of labor which prevails everywhere. An important operating official in another city, who is in sympathy with the movement for the introduction of shorter hours, told me the other day that it would be utterly useless to try to make the change until labor becomes more abundant. The wire mills particularly are suffering on account of the shortage.

Many wire drawers who are receiving big wages work two or three days a week and cannot be induced to work the rest of the week because they are entirely satisfied with the money which they are paid for two or three days and prefer to loaf the rest of the time.

The Seniority Problem

Sentiment among employers in the Central West is overwhelmingly favorable to the attitude of the railroads in standing firmly for the seniority rights of the men who have been employed since the strike was started and there is general regret at President Harding's view of the principle involved. Newspapers are filled with advertisements of the railroads, appealing for men to work in the shops and promising them permanent employment. If, after this kind of advertising, the railroads were to desert the new men, they would be subject to the severest condemnation. There is, however, a feeling that if the strike were declared off to-day, the seniority question would settle itself in a

way that would be satisfactory to at least a large number of the strikers upon their return. It is known that many of the men who have gone into the shops do not expect to become permanent employees. Among the men of this class are large numbers of college students, who, seeing a way to earn large wages for a few weeks, are glad to do so, and they are making from \$7 to \$14 per day. But they will drop out as soon as college opens in September. Parenthetically it may be remarked that these boys are making good, for the product which they are turning out is much greater than that of the ordinary railroad employee. There are many other men who would leave their jobs voluntarily upon the return of the strikers and it is probable that by Oct. 1 only a small percentage of the so-called strikebreakers would continue at work. This, however, does not affect the principle involved, or relieve the railroads of their solemn duty to protect any of the new men who may wish to continue permanently in their present jobs.

G. S.

Iron and Steel in Pennsylvania

Evidence of the predominance of iron and steel among the industries of Pennsylvania is afforded by the annual report for the year 1920 of the Department of Internal Affairs. The outstanding features of this report bearing upon this particular topic are shown in our table. The number of establishments manufacturing metals and metal products was considerably greater than the number in any other industry, and was nearly 16 per cent of the total in the state. The establishments were of considerably greater average size than for the rest of the industries, the capital investment per plant being \$517,700 in iron and steel, against only \$167,800 in other industries. The value of products per plant was \$1,218,000 in iron and steel against \$277,700 in other industries. Not only was the value of products much greater per plant, but the value of products in the iron and steel industry for each \$1,000 invested in the plant was higher, being \$2,360 against \$1,655 for other industries.

While the wages paid in the iron and steel industry were only 17.35 per cent of the total value of products against 24.67 per cent in other industries, the total wages earned per wage earner were greater in iron and steel, amounting to \$1,724 against \$1,354 for other industries.

	Total Industries in Pennsylvania	Metals and Metal Products	Per Cent of Total	Industries Other Than Metals
Establishments, number	26,077	4,089	15.68	21,988
Operation, average days	278	290	....	268
Capital invested, thousands	\$5,799,516	\$2,110,375	36.39	\$3,689,141
Value of products, thousands	11,086,748	4,980,105	44.92	6,106,643
Wages paid, thousands	2,370,758	864,056	36.45	1,506,702
Wages and salaries, thousands	2,757,443	1,017,659	36.90	1,739,784
Wage earners, number	1,614,099	501,169	31.05	1,112,930
Employees, total number	1,795,055	570,026	31.76	1,225,029
<i>Derived Quantities</i>				
Capital invested, per plant	\$222,390	\$513,700	....	\$167,800
Value of products, per plant	425,100	1,218,000	....	277,700
Value of products, per \$1,000 invested	1.912	2.360	....	1.655
Wages paid, per plant	90,900	211,300	....	68,525
Wages paid, per wage earner	1,469	1,724	....	1,354
Wages paid, per operating day	5.29	5.95	....	5.65
Wages paid, per cent of value of products	21.39	17.35	....	24.67

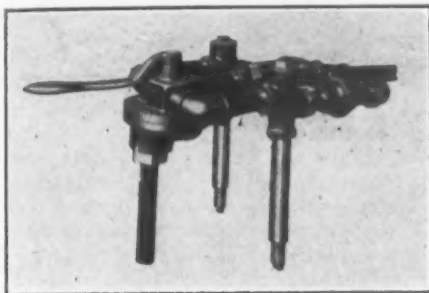
Industrial activity in Bridgeport, Conn., based on 31 factories and reported by the Manufacturers' Association, shows that in the week ended July 29 the number of employees was 60.8 per cent of normal. The number of man-hours was 59.8 per cent of normal, and the average factory hours per week were 99.8 per cent of normal. The average hours worked per employee during that week were 48.2, while the average factory hours were 48.9 during the week. Normal is based on estimates of the individual factories and represents a total of 25,218 employees.

Regulators for Foundry Air Squeezers

The accompanying illustration shows two pressure regulators and a service valve connected in the manner recommended for use on air squeezers for foundry work, the unit being offered by the Canton Pneumatic Tool Co., Canton, Ohio. Arranged as shown, the outfit gives two pressures, each lower than the initial pressure.

The service valve, shown at the left in the assembly, under the handle, is of the disk type. Air is admitted through a fine screen in the bottom of the valve and the bronze disk is pressed firmly against the upper section of the valve by the air pressure. All of the openings are tapped for $\frac{1}{4}$ in. pipe. The exhaust may be turned in any direction, the air passing through

Pressure Regulators and Service Valve for Use on Squeezers. Two pressures are available, each lower than the initial pressure.



other ports in the valve instead of through the regulators. The weight of the service valve is $8\frac{1}{2}$ lb.

The pressure regulator was designed especially for use on air squeezers. It is said to be more reliable and economical than a pop valve, and being entirely mechanical in its action, more uniform results are obtainable than with a pressure gage and the most careful operator. There is no diaphragm or auxiliary valve. Simplicity of construction, durability and convenient installation are features emphasized. Adjustment for pressures from 40 lb. to the initial pressure is made by a screw provided for the purpose. The regulator is calibrated so that no gage is required. The body and piston are of brass and the piston is the only moving part. Openings are for $\frac{1}{4}$ in. pipe.

It is emphasized that to exhaust air rapidly the company's service valve must be used in connection with the regulators. Using only one regulator with the valve gives initial pressure from one side of the valve and a lower pressure from the side to which the regulator is attached.

Fire Clay and Silica Brick Prices Advanced

PITTSBURGH, Aug. 7.—There has been a general advance in all districts of \$3 per 1000 in the price of fire clay brick and \$5 per 1000 for Pennsylvania and Chicago silica brick and \$3 in Birmingham silica brick. This development finds its chief explanation in the rising costs of fuel and labor.

In the Chicago district the silica brick manufacturers are now obliged to pay as high as \$10 per ton for coal, and as it is claimed that two tons of coal are required for producing 1000 brick, there is an indicated increase in cost of \$10 per 1000. The situation in this respect in Pennsylvania and Birmingham is not quite so bad. Most manufacturers in these districts own their own coal mines and, as they usually have only a short haul from the mines to the brick plants, the delivered cost of fuel is not increased as much as in the Middle West.

Manufacturers have found it necessary to make substantial wage increases in order to hold their working organizations and it is claimed that even this move has not been entirely successful, because of the more remunerative scales prevailing in other lines of business.

The new minimum on fire clay brick now is \$35 per 1000, f.o.b. works. The new prices apply to requirement contracts carrying prices at time of shipment, but do not affect such business as is on the books of manufacturers placed at stated prices. Prices on magnesite and chrome brick are unchanged. On account of the restrictive influence on blast furnace and steel plant operation of the coal and railroad strikes,

business in refractories has dwindled to rather moderate proportions.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	\$35.00 to \$38.00	\$31.00 to \$35.00
Ohio	35.00 to 38.00	31.00 to 35.00
Kentucky	35.00 to 38.00	30.00 to 34.00
Illinois	35.00 to 37.00	32.00 to 34.00
Missouri	35.00 to 37.00	30.00 to 34.00
Silica Brick		
Pennsylvania		38.00 to 40.00
Chicago		46.00
Birmingham		43.00
Standard size per net ton (f.o.b. Baltimore and Chester, Pa.)		56.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		30.00
Chrome Brick		
Standard size, per net ton		42.00

Lake Ore Movement in July

Lake Superior iron ore shipments from the upper lake ports in July were 8,942,336 gross tons or 4,894,649 tons in excess of those for July, 1921, or an increase of 120.92 per cent. The total of this season's shipments to Aug. 1 was 17,293,513 tons, which compares with 10,418,914 tons to Aug. 1, 1921. The shipments by ports and for the season in 1921 and 1922 are as follows:

	July, 1921	July, 1922	To Aug. 1, 1921	To Aug. 1, 1922
Escanaba	238,258	799,536	449,062	1,604,130
Marquette	80,470	454,221	133,414	848,765
Ashland	434,088	1,379,608	961,025	2,579,056
Superior	875,005	2,010,368	2,591,235	4,364,963
Duluth	1,731,094	2,872,882	4,639,393	5,126,745
Two Harbors	688,772	1,425,721	1,644,785	2,769,854
Totals	4,047,687	8,942,336	10,418,914	17,293,513
Increase, 1922		4,894,669		6,874,599

The increase to Aug. 1, this year, in the season shipments was 6,874,599 tons or 65.98 per cent as compared with last year. Duluth contributed 29.64 per cent of the total against 44.53 per cent a year ago. Escanaba and Ashland made substantial gains this year.

Safety Hook for Mill and Cargo Use

A hoisting hook known as the Smith safety cargo hook, and which as the name implies, is intended to provide for safer operation than afforded by hooks of the usual design, is being offered by the Smith Forge Co., Camden, N. J.

The device is shown in the accompanying illustration. The outstanding features are the self attaching and locking catch; plumb balance, which eliminates the near approach for attaching the hook to the crucible,



Safety Hoisting Hook. The features include the self-attaching and locking catch and the plumb balance, which eliminates near approach in attaching the hook to the crucible.

bucket or other object to be hoisted; and the guide butt, which facilitates attaching the hook and also prevents it from catching on projections during the hoisting operation.

A device of this kind aids materially in reducing the risks incident to handling molten metal. The hook is self attaching and it is not necessary to approach the ladle to make the hook fast. The hook is merely lowered over the handle or sling of the bucket or ladle, and it automatically locks. It is of steel, drop-forged, and available in four sizes, from one to six tons.

COAL, COKE AND ORE STORAGE

Diagram and Formulas for Calculation — Table Gives Certain Specific Examples

BY A. D. WILLIAMS*

IT is often necessary to estimate the storage capacity that may be secured on a certain area available. The general practice of obtaining estimates from the manufacturers of the cranes and bridges may require more time than is available, or may not be desirable in the case where only a preliminary estimate is desired, to compare different localities. The following data will be convenient for this purpose, and is accurate enough to permit the comparison of various sites.

Bituminous coal, per gross ton (2240 lb.) = 43 cu. ft.

Storage capacity for coke = 0.6 capacity for bituminous coal; ore = 2.25 capacity for bituminous coal.

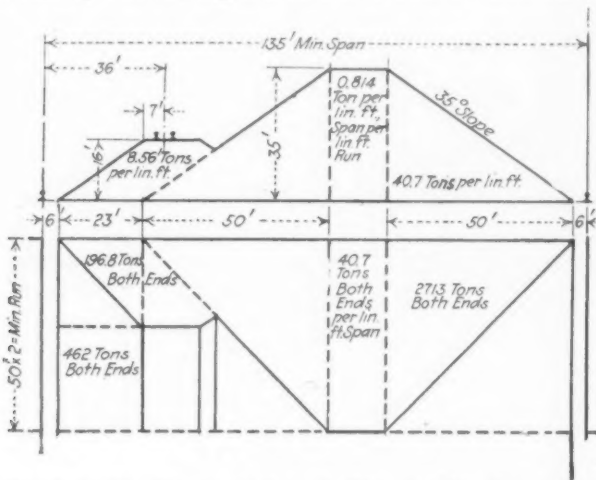
Anthracoite coal = 1.10 capacity for bituminous coal.

Slope angle = 35 deg. Height of pile = 35 ft.

R = length of run or bridge travel in feet; minimum = 100 ft.

S = span between runway rails in feet.

There are two cases to be considered: 1—When the stocking and loading tracks are located under a canti-



Diagrammatic Representation of Pile of Bituminous Coal with Stocking Track on a Trestle 16 Ft. Off the Ground. The tonnage figures shown permit quick calculation of contents of pile for any reasonable length and width

lever at the end of the bridge. In this case the minimum span is 112 ft., giving 6 ft. clear between the bottom of the slope and the track. For this case the minimum run (100 ft.) gives a storage capacity of 2713 tons for the minimum span—for the pile will be a pyramid 100 ft.

square and 35 ft. high, and $\frac{100 \times 100 \times 35}{3 \times 43} = 2713$. For a greater run and span, tons, total = $2713 + [40(S - 112)] + [40 + [0.8(S - 112)]] \times (R - 100)$. The table gives typical examples.

Capacities in Gross Tons of Typical Rectangular Piles (Without Track Raised on Trestle)

Ground Dimensions of Pile	Bituminous Coal	Anthracoite Coal	Coke	Iron Ore
100 x 100 ft.	2,713	2,984	1,628	6,104
100 x 200 ft.	6,783	7,461	4,070	15,251
100 x 500 ft.	18,992	20,891	11,395	42,732
100 x 1000 ft.	39,341	43,275	23,605	88,517
120 x 200 ft.	9,225	10,147	5,535	20,756
120 x 500 ft.	26,318	28,950	15,791	59,216
120 x 1000 ft.	54,806	60,287	32,884	123,314
150 x 200 ft.	12,888	14,177	7,733	28,998
150 x 500 ft.	37,307	41,038	22,384	83,941
150 x 1000 ft.	78,004	85,805	46,802	175,509

2—When the stocking track is located on a trestle 16 ft. high above the base of the pile and under the bridge the minimum span is 135 ft., which for a minimum run (100 ft.) gives a storage capacity of 3372 tons. This is illustrated. For a greater run and span, tons, total = $3372 + [40(S - 135)] + [40 + [0.8(S - 135)]] \times (R - 100)$.

Both the above cases refer to bituminous coal. The

*P. O. Box 92, Newark, N. J.

other materials mentioned may be substituted by using the factors given.

The total length of track required will be:

$$L = R + 10 + \text{wheel base of gantry.}$$

As a general proposition, a wide pile is more economical in operation, owing to the greater tonnage which may be handled without moving the bridge. Long span bridges, however, are costly and it is a case of balancing bridge cost and runway cost to obtain the maximum storage with the minimum of investment.

To Report on Three-Shift Day

Findings in a nation-wide survey of the three-shift day in American industry will be placed before the executive board of the American Engineering Council of the Federated American Engineering Societies, at a meeting of the board to be held in Boston, Sept. 8 and 9.

Two reports, dealing with exhaustive investigations of the two-shift and the three-shift day problems in numerous industries, including metal working, mining and others, will be presented. One, prepared by Horace B. Drury, formerly of the faculty of Ohio State University, will describe the extent of two-shift operation in the continuous industries as well as the procedure followed and the results noted by those companies which have changed from the two-shift day of twelve hours each to the three-shift day of eight hours each. Mr. Drury's report will discuss the general practicability of abolishing twelve-hour turns.

A second report on an investigation of the modus operandi involved in changing the operations of a steel plant from two-shift to three-shift methods will be made by Bradley Stoughton, former secretary of the American Institute of Mining and Metallurgical Engineers. Both investigations are being directed by the American Engineering Council's committee on work periods in continuous-operation industries, of which H. E. Howe, Washington, president of the American Chemical Society, is chairman.

The findings of the committee, which are expected to be a notable contribution to the facts of present-day industry, will be presented to the Boston meeting of the engineering board, composed of engineers from all parts of the country, for definite action. A preliminary report by Mr. Drury estimates that "very roughly, the number of shift workers in the United States is probably well over 500,000, though likely not as large as 1,000,000." Industries of the South and the Far West are included in the survey as well as the industries of the East and Middle West.

The number of men on 12-hr. shifts in the period preceding the industrial depression was given as "perhaps not far from 300,000, of which about as many were outside the steel industry as within it." The committee, according to the investigators, "has been endeavoring to chart what is practically an unexplored field."

Mortimer E. Cooley, dean of the engineering schools of the University of Michigan, and successor of Herbert Hoover as president of the federation, will preside at the executive board meeting.

Metal Corrosion Studies

A study of film formations on metals under corrosion conditions will be made by the Bureau of Mines at Pittsburgh as a part of the general program of the study of corrosion of metals by acid mine waters. A study will be made of the formation of surface films on metals and alloys when exposed to corroding media, and an examination will be made of the effect of such films on corrosion inhibition. R. J. Anderson, metallurgist, and James R. Adams, research fellow of the Carnegie Institute of Technology, have been detailed for the work.

A research bulletin on the "Effect of Impurities on the Oxidation and Swelling of Zinc-Aluminum Alloys," has been issued by the New Jersey Zinc Co., 160 Front Street, New York. The authors are H. E. Brauer and W. M. Pierce of the company's research division.

Shaper Used in Planing Bearing Seats

A regular shop production job previously done on a planer, but at present handled on a 24-in. Gould & Eberhard shaper, the change being said to result in a saving of 30 per cent in the time for handling and setting up the casting, as well as a saving in machining costs, is shown in the accompanying illustration.

The operation consists in planing the bearing seats for the caps on 6- x 6-in. compressor frames built by the Brunswick Refrigerator Co., New Brunswick, N. J. The two sides of one bearing are planed, the casting being then turned through 180 deg. bringing the opposite bearing in place for machining.

A special extension tool holder with an over-reach of 6 in. beyond the regular tool position is used. This



Shaper Used in Machining the Bearing Seats for the Caps on Compressor Frames

permits the tool to plane the entire length, 4 $\frac{1}{2}$ in., of the bearing without interference of the shaper head with the compressor frame, the sides of the frame being too close together to permit the shaper head or ram to pass through.

Engineers to Discuss Economics

The economics of industry has been selected as the major subject of the ninth national convention of the Society of Industrial Engineers to be held in New York at the Hotel McAlpin, Oct. 18 to 20. An address at the opening meeting will be on the relation of economics to industry and another on economics' part in the formation of a policy of business administration.

An evening meeting will be devoted entirely to addresses on "The Budget and the Financial Forecast," "The Business Cycle," and "The Importance of the Elimination of Waste to the Economic Structure," the latter address to be made by L. W. Wallace, executive secretary Federated American Engineering Societies. "Two Important Economic Factors" is the topic selected for an afternoon meeting, 15 min. papers by executives and workmen, followed by discussion being scheduled, the papers and discussions to be on specific subjects of "How We Can Reduce Production Costs," and "How Can We Keep the Worker Contented."

Sectional meetings for managing executives, production managers, sales managers, industrial relations directors, accountants and educators are included in the program as heretofore, and the International Committee for the Elimination of Unnecessary Fatigue will hold an open meeting.

The banquet will be held on Thursday evening, Oct. 19, with Prof. Joseph W. Roe, president of the

society, as toastmaster. The addresses will include "The Relation of the Economist to Business," and "Finance and Industrial Economics." At an afternoon meeting the society will be addressed on the "Economic Aspect of Production," and on the subject of "The Industrial Age."

A special feature will be an exhibition of factory and office equipment and appliances designed to save labor and reduce fatigue, which will be held in a room adjoining that in which the principal meetings will be held.

On the evening before the convention, there will be a joint meeting of the society with the Taylor Society and the American Society of Mechanical Engineers.

Eighth Annual Chemical Exposition

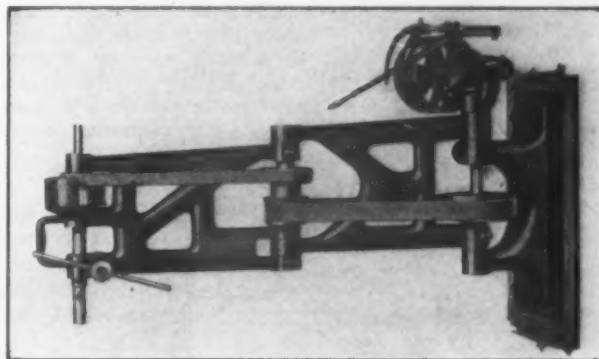
Preparations are going on for the eighth national exposition of chemical industries at the Grand Central Palace, New York, Sept. 11 to 16. A large list of exhibitors has been already announced and nearly all the space has been taken. Besides technical sessions, 15 feature films on chemical and other industrial subjects have been scheduled, some of them being shown for the first time. Among them are the "Story of Sulphur," "Story of Heavy Excavating Machinery," "Story of Air Reduction" and the "Story of Natural Gas."

New Wall or Post Bracket Drill

A new wall or post bracket drill covering a radius of 3 $\frac{1}{2}$ ft. and designed for light drilling operations, being especially adapted to stove work, electrical and switchboard work, has been brought out by the Hammond Mfg. Co., Cleveland. The drilling capacity in steel is $\frac{3}{8}$ in.

The general construction may be seen from the accompanying illustration. The drive is through the tight and loose pulley countershaft and bevel gears to an upright shaft. The countershaft yoke can be set to any position to conform to overhead drive, and is provided with convenient belt shifter. The arms swing on stationary sleeves, an arrangement intended to prevent undue pressure on the driving shafts. The spindle is equipped with a ball thrust bearing. The spindle quill is of steel with bushed bearings and is provided with a rack cut from solid. A spring counterbalance is provided.

The machine is equipped with belts as shown, and with belt guard for the spindle pulley. The traverse of



Bracket Drill for Light Drilling Operations. The capacity is $\frac{3}{8}$ in. in steel

the spindle is 2 $\frac{1}{2}$ in. The hole in the spindle is for a No. 2 Morse taper. The pulleys are 8 in. in dia. and run at 400 r.p.m., the spindle speeds being 500 and 1300 r.p.m. The shipping weight in 250 lb.

Federated Engineering Societies Adds Members

The Engineers' Club of Louisville, Ky., has applied for membership to the Federated Engineering Societies and the committee on procedure has approved the application.

Among the notable additions to the federation is the Engineers' Club of Columbus, Ohio, which has appointed Prof. James R. Withrow of Ohio State University as its representative on the American Engineering Council.

Anti-Friction Bearings in the Steel Mill

Mounting Details of Ball and Roller Bearings—Use and Care of Ball Bearings—Provision for Lubrication

BY A. M. MAC CUTCHEON

(Continued from page 268, Aug. 3)

IN successfully designing a mounting of an anti-friction bearing motor, the following points must be kept in mind:

- a. Ease of assembly. It should be possible to draw the bearing off the shaft without transmitting pressure from the

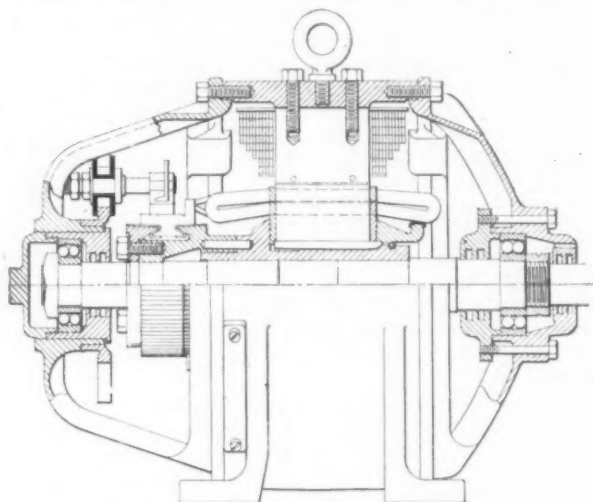


Fig. 3. Typical Ball Bearing Mounting on General Service Direct Current Motor

outer race to the inner race through the ball. It should be possible to remove the armature without removing the bearing from the shaft.

- b. The bearing should be protected against the entrance of dirt or grit. If such foreign substances are present within the bearing, its life will be short.
- c. The lubricant must be retained within the bearing housing.
- d. The bearing must be the proper fit on the shaft and within the housing.
- e. The inner race of the bearing must be locked in place, against a suitable shoulder, by a suitable locking nut.

Fig. 3 represents a typical mounting on a general service direct current motor. At the commutator end

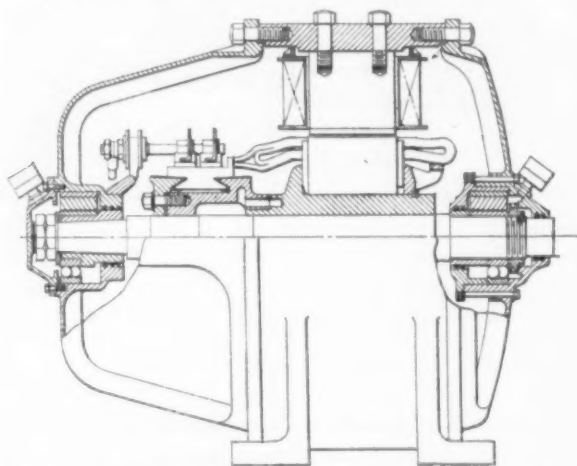


Fig. 4. Composite Mounting Using Both Balls and Rollers in the Bearing

the bearing is entirely inclosed in a cartridge which is removed from the motor with the armature. Such inclosure is believed the most satisfactory form of mounting, but is somewhat expensive. The armature

may be entirely removed from the motor without disturbing the fit of the ball bearing on the shaft. A suitable mounting is always difficult at the commutator end of a direct current motor of the general service type, since the outer dimensions of the bearing housing are limited by the position of the rocker. Fig. 4 is a composite mounting, showing the application of a ball or roller bearing to the same motor.

Fig. 5 shows a typical mounting of a vertical general service motor, in which the armature weight is carried by a thrust ball bearing at the top.

Fig. 6 is an application of a ball bearing to a mill type motor. The bearing is completely inclosed in a cartridge, which is removed from the motor with the armature, effectively excluding foreign substances. This application was laid out in connection with changing over oil-type motors to anti-friction type. The ball bearing is mounted on a sleeve driven by a Woodruff

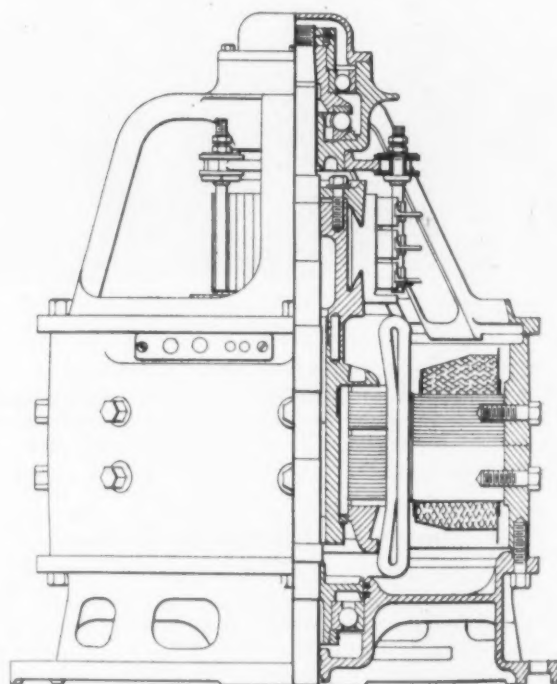


Fig. 5. Vertical Ball Bearing Mounting on General Service Motor

key. The sleeve has the advantage of a long bearing on the shaft, and may be required in very heavy service.

Fig. 7 represents the mounting of a ball bearing in a steel mill motor, with the bearing carried directly on the shaft, and without the cartridge inclosing the bearing. Unusually complete protection is provided against the escape of grease by what may be described as the "labyrinth" type of groove. As nearly all types of anti-friction bearings will take a considerable end thrust, from 30 or 40 per cent of the radial capacity of the bearing up to 100 per cent or over, it is not necessary to provide any other device to take the end thrust ordinarily found in motors.

Fig. 8 shows an application to a general service motor with the "labyrinth" type of grease groove; but as this mounting does not permit removal of the armature without the removal of the bearings from the shaft,

it is not to be recommended—certainly not in a steel plant.

Fig. 9 shows the application of a tapered roller bearing with the bearing completely inclosed in a cartridge. Disassembly is accomplished by removing the outer cap screws, and rotating the cartridge so that the extended bosses will clear the extended bosses on the bracket. Wear on such a bearing may be compensated for by removing shims between the outer and inner inclosing caps.

Fig. 10 represents the installation of a tapered roller

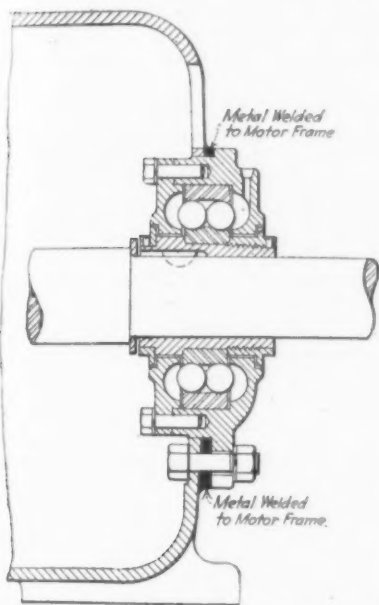


Fig. 6. Ball Bearing Mounting on Mill Type Motor, Inclosed in Cartridge

bearing in a split frame motor. The armature may then be removed by lifting the top half of the frame. The shims for adjustment after wear are again evident.

Consideration should be given to allowing a fair-sized space for lubricant, and to its introduction through a tapped hole closed with a pipe plug, a grease cup or other suitable means. All ball bearing manufacturers seem to be in accord that the inner race should be

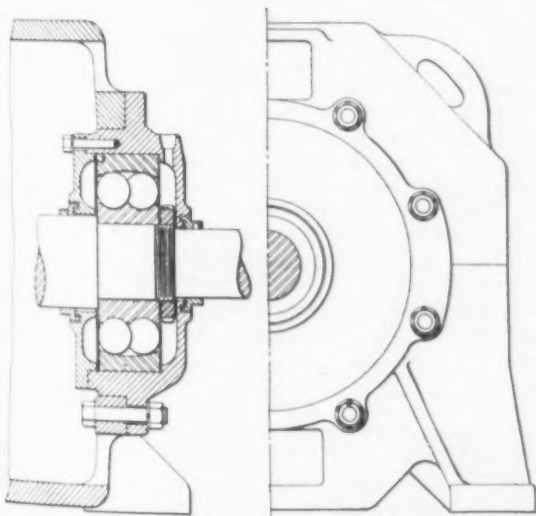


Fig. 7. Ball Bearing Mounting on Mill Type Motor, with Bearing Carried Directly on the Shaft

mounted on the shaft with a light drive fit, from 0.0006 to 0.002 force, depending upon the size of the shaft. The outer race should be a sucking fit in its housing, permitting a slight creepage of the outer race if such a tendency is present. The end play should be taken on one bearing, and the one carrying the heavier load is preferable. Either grease or oil may be used for lubrication; for speeds up to 2000 r.p.m. on 5 to 20-hp. motors, grease is recommended, because of the advantage in eliminating any possibility of oil getting into

the motor. At very high peripheral speed oil is found preferable.

Great care must be exercised to protect the ball bearing before installation in the motor, and during

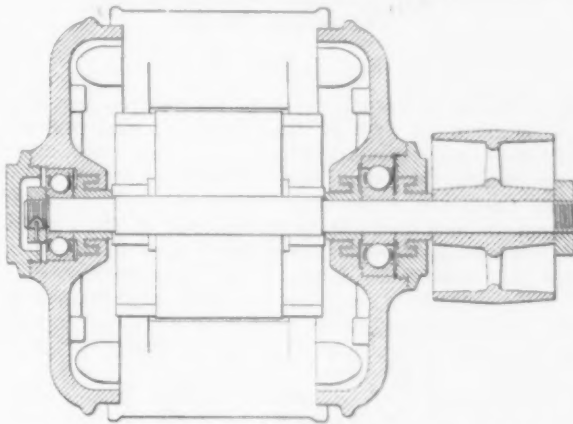


Fig. 8. Ball Bearing Mounting Fitted with Labyrinth Type Grease Grooves

the process of assembly, against the entrance of grit or foreign substance, as the presence of such substance will most certainly result in wear and the eventual failure of the bearing. If the armature is removed from the frame with the bearing not inclosed in a cartridge, the bearing should be carefully wrapped while the armature is out of the motor. To offset this, it is claimed that very little attention need be given the lubrication of the bearing while the motor is in operation. There are cases where anti-friction bearings have operated over a period of three to four years, without being greased. This is, of course, not recommended. Speed and heat conditions are the governing factors. Wherever possible, grease should be applied at intervals of about six months.

Probably the best practice would be for the operator to make monthly inspections at the time of the installation, in order to judge how long the lubricant will remain serviceable under the conditions existing in his particular plant, and then establish a period for applying grease. In no case should the housing be packed full of grease, as this will cause severe heating in operation. It is the prac-

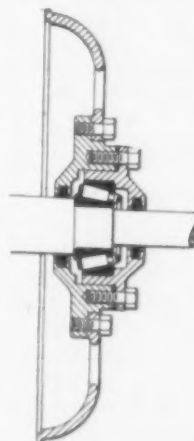


Fig. 9. Tapered Roller Bearing Completely Inclosed in a Cartridge

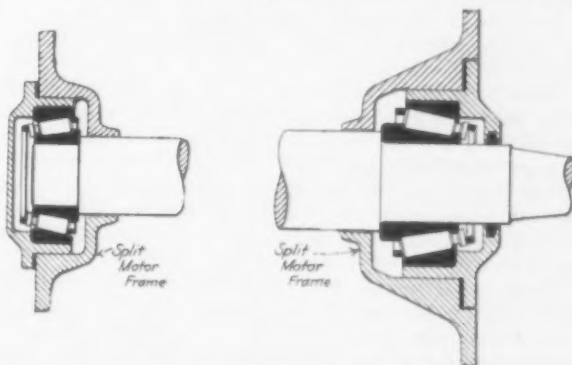


Fig. 10. Tapered Roller Bearing in a Split Frame Motor, Permitting Easy Removal of the Armature

tice of the ball bearing manufacturers to slush bearings with a coating, to avoid rust. Before installation, they should be cleaned with gasoline to remove this slush, as it is not a good lubricant, and under certain conditions will cause heating.

(To be concluded)

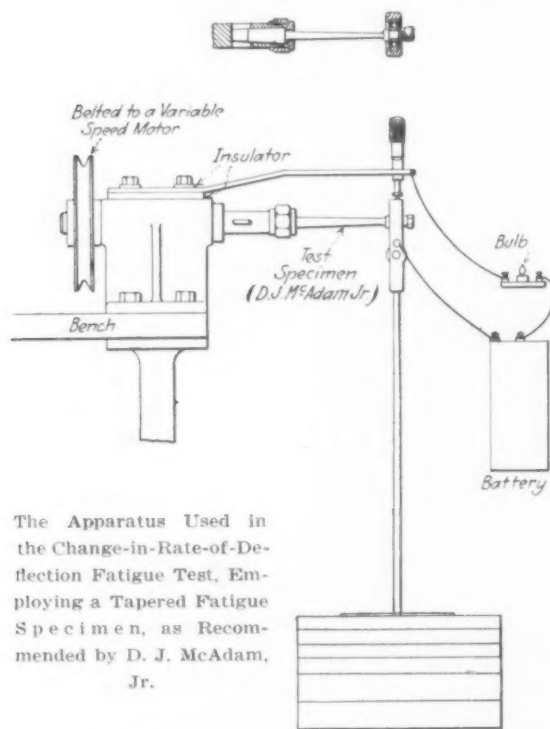
NON-FERROUS METAL FATIGUE*

Present Status of the Knowledge of the Fatigue Strength of Some Aluminum and Magnesium Alloys

BY R. L. TEMPLIN

AT the present writing, all of the fatigue investigations on the wrought ferrous metals have indicated that there is at least a practical endurance limit, at and below which the metal will withstand an indefinitely large number of repetitions of stress without failure. The same laws that obtain in the case of the wrought ferrous metals, however, apparently do not hold in the case of at least some of the non-ferrous metals.

It is quite true that the available fatigue data for the wrought non-ferrous metals are rather meager, but such as there are indicate an increase in the



The Apparatus Used in the Change-in-Rate-of-Deflection Fatigue Test, Employing a Tapered Fatigue Specimen, as Recommended by D. J. McAdam, Jr.

life of the metal with a decrease in the fiber stress to a point where an apparent endurance limit is reached. At this point the SN diagram becomes horizontal or nearly so, and stays so up to a second point, where the slope of the SN diagram again changes to a value approximating the slope of the first part of the curve. That is, there is a sort of an arrest in the curve, which in the case of duralumin may start at from 2×10^6 to 7×10^6 repetitions of stress and extend to 2×10^7 plus repetitions of stress.

More long time fatigue tests are necessary and are being made to establish the certainty of this kink in the SN diagram for wrought non-ferrous metals. It is perhaps significant that such a shape for the wrought ferrous metal curves has been rather anticipated by the joint committee on fatigue of metals, although it has not been found to date using specimens which have been tested to 7×10^6 repetitions of stress.

Some experimental work has been done in the technical direction bureau of the Aluminum Co. of America in an attempt to check or disprove the results obtained by Mr. Gough† using the change-in-rate-of-deflection method for determining the endurance limit. In these

tests the tapered fatigue specimen, style E, as recommended by D. J. McAdam, Jr.‡ together with test apparatus as shown schematically in the illustration was used.

Tests were made on hard rolled 17S [aluminum alloy of the Aluminum Co. of America], heat treated 17S and aluminum-magnesium alloy rod using speeds of rotations of approximately 100, 400, 1000 and 1400 r.p.m. In every instance a straight line deflection curve was obtained up to a point considerably above the proportional limit as determined by the Ewing extensometer and plotting the stress strain values to the scale 1 in. = 5000 lb. per sq. in. (ordinates) and 1 in. = 0.002 in. per in. (abscissa). In some cases the straight line deformation persisted above the yield point of the metal.

For the routine fatigue tests, however, in the testing laboratory of the technical direction bureau of the Aluminum Co. of America, the rotating beam type fatigue testing machine is used. The machines, while considerably larger than those used by the joint committee at the University of Illinois, are quite similar and have been found to give satisfactory and consistent results. The type of specimen used in these machines for the long time fatigue tests is substantially that as used by the joint committee and when the test data derived becomes available, it should be comparable to the data obtained by the joint committee on wrought ferrous metals.

Merchant Ships Under Construction

According to returns of Lloyd's Register, the number of merchant ships under construction at the end of June was about 1016, of a total of 3,780,430 gross register tons. This includes an estimate of 150 ships and 545,000 tons for Germany. Particulars by nations will be found in the appended table. It will be noted that the British Isles are credited with just about half of the total tonnage, but it should be remarked that 25 per cent of the tonnage reported under construction in the British Isles has been suspended, no work being done on it at present. The same condition pertains to more than 40 per cent of the tonnage under construction in Italy, as well as a considerable tonnage elsewhere on the continent of Europe.

Much of the tonnage now being built in the United States is special and of a character which could not well be filled by the Shipping Board ships, at present tied up in such large numbers. As a matter of fact, almost half of the total American tonnage building consists of tank vessels intended to carry oil in bulk.

Among the steel vessels, those building in the British Isles will average 4969 tons each and those building in the United States will average 4641 tons each and those building elsewhere (outside of Germany) will average 3144 tons each. The average for the entire group is 4127 tons. The American position is well shown by the fact that Italy, France, Holland and Germany all have larger tonnages under construction than has the United States. This is, of course, due to the fact of so many Shipping Board vessels being idle.

Merchant Vessels Under Construction, June 30, 1922

	Total		Built of Steel	
	No.	Gross Tons	No.	Gross Tons
British Isles	390	1,919,504	386	1,917,957
United States	36	150,623	31	143,885
Italy	88	285,671	53	273,526
France	53	243,290	53	243,290
Holland	99	226,318	99	226,318
Japan	26	115,512	26	115,512
Scandinavia	81	145,527	73	143,302
12 other countries	93	148,985	53	130,539
Germany (est.)	150	545,000	120	500,000
Total	1,016	3,780,430	894	3,694,389

The Wickwire Spencer Steel Co. is installing some of the heavy grill making equipment from the former Wright Wire Co., Worcester, Mass., mill, in its Clinton, Mass., plant. Production of fine wire screening at the Clinton plant will continue throughout the summer and fall on a full day and night shift schedule. In previous years production was somewhat reduced during these months.

*An elaboration of the discussion of Prof. H. F. Moore's paper on "Fatigue or Progressive Failure of Metals Under Repeated Stress" at the annual convention of the American Society for Testing Materials in June at Atlantic City. The author is chief engineer of tests, research bureau, Aluminum Co. of America, New Kensington, Pa.

†"Improvements in Methods of Fatigue Testing," by H. J. Gough, B.Sc., in *Engineer*, Aug. 12, 1921, page 159.

‡"Endurance of Steel Under Repeated Stresses," by D. J. McAdam, Jr., in *Chemical and Metallurgical Engineering*, Dec. 14, 1921.

Special Strike Legislation Forecasted

House of Representatives Called for a Definite Session
Regardless of Tariff Bill Situation—Putting Teeth
in Transportation Act Regarded Likely

WASHINGTON, Aug. 8.—The fact that President Harding has asked the House of Representatives to remain in continuous session when it convenes next Tuesday, Aug. 15, leads to the assumption here that the Executive will ask for some special legislation to deal with the coal and railroad strikes if satisfactory progress toward a settlement has not been made by that time.

Just what form such legislation may take has not been indicated by any Administration spokesman, but it is considered likely that it will take the form of an amendment to the Transportation Act putting "teeth" in it so that a penalty will be attached to violations of decisions of the Railroad Labor Board.

The President will probably address a special message to Congress discussing the strikes, should the situation at that time seem to require drastic action on the part of the Government.

While official Washington was fairly optimistic today regarding a possible settlement of the coal strike through the results of the Cleveland meeting of operators and miners Monday, it can not be said that the same holds true of the rail situation. President Harding's latest move as voluntary negotiator has apparently not found favor with representatives of the shop mechanics' organization, while the attitude of the railroad presidents as expressed by individuals among them is not wholly one of approval.

Because of the critical nature of the present situation, the President has asked the House of Representatives to reconvene on Aug. 15, regardless of whether the tariff bill is ready by that time. When the House adjourned it was with the understanding that it would reassemble on Aug. 15 and immediately adjourn if the tariff bill was not ready for submission.

President Harding and his cabinet are making no effort to belittle the growing seriousness of the coal

and rail strikes. The attitude of both sides in the railroad strike on the seniority question leaves little room for optimism that this difference can be easily compromised. Representatives of the shop men are even opposed to leaving the question to the railroad labor board for decision.

Contractors Protest Against Priority Order

WASHINGTON, Aug. 8.—That the greater part of the construction projects now under way throughout the country will be forced to shut down for lack of construction materials unless the present coal priority order is modified is the statement made to-day by the Associated General Contractors of America in a petition of protest to the Interstate Commerce Commission. The association is "looking not so much to the immediate situation as to that which will prevail when the coal and railroad strikes shall have been settled.

The petition calls attention to the fact that with the reopening of the mines, the demand for coal will be not less than 320,444 cars per week. Of the maximum 324,000 serviceable cars only 291,000 will be suitable for the loading and transportation of coal, leaving only 33,000 open-top cars weekly for all other purposes. Going on the assumption that the coal and railroad strikes will be settled shortly, and that the present priority order stands, the contractors estimate the probable demand and supply of open-top cars weekly during August, September and October will be as follows:

Weekly Needs of Open Top Cars

Commodity	Demands	Supply	Per Cent Supplied
Coal	320,000	291,000	91
Sandstone and gravel	50,000	10,645	21
Ore	40,000	8,516	21
Iron and steel	25,000	5,322	22
Miscellaneous	20,000	4,258	21
Limestone	10,000	2,129	21
Coke	10,000	2,129	21

Coal Priority System Slowly Developing

Railroads and Public Utilities Take Present Production and Even with
Fair Expansion of Output Some Stopping of
Plants Appears Inevitable

WASHINGTON, Aug. 8.—Henry B. Spencer, Federal fuel distributor, said to THE IRON AGE that the present production of bituminous coal will take care only of classes 1 and 2 of the priority list, and that for class 4, which includes steel manufacturers, blast furnaces and industrial plants generally, there will be no coal available.

Until the working plans of the Federal fuel distribution committee are fully operative industrial users of coal may continue to get some of the supplies which they have bought, but these will gradually be cut off under the system of car allotment to mines for the prior classes and these prior wants will be taken care of before coal can be shipped to any other designation.

There are a few steel companies operating by-product coke ovens which furnish gas to municipalities, and these in all probability will get coal for coking purposes under the public utility preference, but it may be that their supply will be limited so that only as many ovens can be operated as are absolutely necessary for supplying municipal light and heat.

Coal Stocks Greatly Reduced

A survey of the coal stocks of the industrial plants of the country has been completed by the President's

committee, revealing that the 400 plants from which returns were received had on Aug. 1 only 20 days coal supply. This, of course, is an average percentage, some plants having several weeks supply while others were within a few days or a week of the bottom of their coal stocks and were facing shutdowns.

With the organization plan of the fuel distribution committee completed, there was a rush to Washington by representatives of industries of all classes for priorities, but in most instances these claimants for consideration were referred to their State fuel agencies, which will take care of their wants, if possible, after the priorities which have been established under Government order are provided for.

It has been estimated that the daily consumption of bituminous coal in the United States at present is 1,600,000 tons, so that it may be seen that railroads, public utilities and industrial plants generally are eating into their stocks at an enormous rate, as the soft coal production is roughly only 4,000,000 tons a week or considerably less than half of the amount being consumed.

The railroads require at least 280,000 tons daily or half of the soft coal now being produced, while it is estimated that the public utilities of the country re-

quire 1,500,000 tons weekly, which will take most of the remaining half of present production.

Northwest Asks for 12,000,000 Tons

In addition to these pressing wants, which have been given first claim upon coal supplies by the Government's distribution plan, the Northwest, which relies on getting its winter supply of coal by way of the Great Lakes before the close of navigation, has asked for the shipment of 12,000,000 tons additional, and the fuel distribution committee is planning to begin shipments of this not later than Sept. 1. As there will then be only about 12 weeks remaining in the navigation season, this means a shipment of not less than 1,000,000 tons weekly.

Thus it will be seen that the steel industry will have very little, if any, coal to draw upon until there is an increase in production. Before the strike of railroad shopmen, the coal mines were producing about 5,500,000 tons a week and this has been brought down to less than 4,000,000 tons, though slight gains have been made in the past two weeks. In 1921, with industry operating at a much lower rate than this year, 407,000,000 tons of soft coal were mined. It is estimated that the minimum requirement of the country under present conditions is 7,000,000 tons a week and this does not allow anything for stocks which must be carried during the winter months to insure against delays in transportation due to ice and snow. Therefore, until soft coal production can be greatly increased the iron and steel industry and other manufacturing industries will have troubles which undoubtedly will become more serious while the railroad and coal strikes continue.

While it is intimated here that the steel industry because of its essential character in the maintenance of railroad transportation will have a certain degree of preference among industrial plants, this preference will amount to little or nothing until there is an increase in the coal supply. A question that has been considered this week by the fuel distribution committee is what shall be done with coal mined by steel companies in their own mines and transported in their own cars. It has been stated that no extreme measures will be resorted to unless necessary, but that the steel industry, in common with others which have been placed among the deferred priorities, will be asked to cut down voluntarily on its coal consumption.

Visits to Washington Not Advised

In this connection it may be stated that it will do little good for officials or other representatives of manufacturing plants to come to Washington in an effort to get coal. The fuel distribution committee has been obliged to turn away many who have visited Washington this week for such purpose. The time of the committee has largely been taken up with conferences and getting its program under way and members of the committee have not had the time to interview those who have come to see them. The result is that these special messengers have usually not gotten further than a clerk in the fuel distribution committee's offices, who has told them to take up such matters with the State fuel agencies, a list of which appeared in THE IRON AGE of Aug. 3, p. 299. The Government's committee will confine its work chiefly to getting coal for railroads, public utilities and States.

Another Voluntary Coal Price Agreement Proposed

WASHINGTON, Aug. 8.—Skyrocketing coal prices in Pennsylvania was the subject of a conference to-day between representatives of operating mines in that State and Secretary of Commerce Hoover and Federal Fuel Distributer Spencer. The purely voluntary price arrangement of June 1 of \$3.25 to \$3.50 a ton broke down two weeks ago partly due to the fact that some coal producing districts refused to co-operate in the voluntary agreement at that time and partly due to conditions brought about by the railroads offering \$1.50 above the fair price for coal in the districts

which did agree. Many coal operators in the districts where the voluntary agreement was made have held to the fair price, but other districts are asking as high as \$7 to \$8 a ton.

The operators proposed at to-day's conference that a new fair price should be fixed at a somewhat higher level than that of June 1 to allow for increased working expenses due to car shortages and partial operation of mines. Inasmuch as the bulk of Pennsylvania production is consumed in that State, it was deemed a matter in which the Pennsylvania authorities should participate. Hence a meeting has been arranged for Wednesday, Aug. 9, between Governor Sproull's State coal committee and the Administration officials for consideration of the matter.

Plan of Organization for Coal Distribution

WASHINGTON, Aug. 8.—Henry B. Spencer, the Federal fuel distributor, has announced the following plan of organization for the distribution of available coal supplies in the present emergency.

The President's fuel distribution committee, consisting of Secretary of Commerce Hoover, chairman; Attorney General Daugherty, Secretary of the Interior Fall, Commissioner Aitchison of the Interstate Commerce Commission and Federal Fuel Distributer Spencer, has appointed the following administrative committee for the purpose of directing the distribution of all available supplies among the railroads, Federal institutions and States:

H. B. Spencer, Federal Fuel Distributer, Chairman.

Staff	Coal Operators' Advisory Committee
Samuel Porcher, Railroad fuel.	C. E. Bockus, Chairman, Virginia.
Le Baron S. Willard, Tidewater coal.	E. E. White, Southern West Virginia.
J. N. Snider, New England and Eastern.	E. C. Mahan, Southern Appalachian.
C. E. Tuttle, Lake coal.	E. L. Douglas, Eastern Kentucky.
George F. MacGregor, Southwestern region.	William J. Magee, High volatile district of Southern West Virginia.
E. M. Durham, Jr., Southeastern region.	George R. Francis, Pennsylvania.
E. W. Thornley, Manager of orders.	
F. G. Tryon, Geological Survey.	
Lt. Com. E. A. Coby, United States Navy.	

M. J. Gormley, American Railway Association.

J. C. Roth, Interstate Commerce Commission.

D. R. MacLeod, secretary to the committee.

In addition district committees have been created in the principal coal-producing districts for the purpose of distributing orders from the Federal fuel distributor among the mines. These committees shall consist of a representative of the fuel distributor, Interstate Commerce Commission, coal operators and the railroads. District headquarters have been established in the following coal regions:

Norton, Va.—All of Virginia except the Pocahontas district.
Bluefield, W. Va.—Pocahontas, Winding Gulf, New River, Tug River and Virginian districts.
Huntington, W. Va.—Kanawha, Logan, Williamson and Big Sandy districts.
Knoxville, Tenn.—Fields in Southeastern Kentucky outside of Harlan and Hazard; all mines in Tennessee.
Louisville, Ky.—Harlan, Hazard and Western Kentucky fields on Louisville & Nashville and Illinois Central railroads.
Birmingham, Ala.—All mines in Alabama.

Gradual Working of Priority Plan Expected

Pending the completion of this organization, three intermediate stages will ensue: 1. Continuation of their normal business by the operators; 2. Priority buyers in accordance with the Interstate Commerce Commission service order No. 23 will gradually encroach upon operators' business; 3. Coal orders placed through the Federal fuel distributor for railroad purposes and State committees will gradually absorb the total output of the mines.

This latter clause is a direct quotation from a statement given out at the Federal fuel distributor's office and indicates as clearly as anything that has been stated as to what extent industrial plants may expect

to get coal until there is a marked increase in production.

Governors of all States have been asked to create fuel committees, the orders from whom will be sent to the Federal fuel distributor here. These State committees have been asked to report to Washington a list of those who should receive priority coal for current use, not for storage, in the order of the emergency of their need; also the nature of the consumer, whether public utility or industrial plant; the amount of coal on hand and the amount required by each to maintain operation.

The State committees are expected to distribute such coal as may be allotted to them in the following order: 1. Public utilities and public institutions; 2. Household coal; 3. Industrial manufacturing public necessities; 4. Industries in general.

Until such time as priority orders from the Federal fuel distributor shall reach them, coal operators are expected to operate individually as they have been.

Coke Supply Problem

The Federal fuel distribution committee will probably consider the question of coke supply this week. The probability is that some means will be found to take coking coal and divert it to other use. A problem in this connection is what to do with coal mined by coke companies and shipped over their own lines and in their own cars direct to the coke ovens. This whole question will doubtless be decided before the end of the week.

Consumption of tin plate for food packing will not be materially affected by the coal priorities, the Federal Fuel Distributor having assured canning companies that coal will be provided for them to prevent spoilage of the large quantities of farm crops.

More Workers and Increased Coke Production in Connellsville Region

UNIONTOWN, PA., Aug. 7.—Fuel production in the Connellsville bituminous region for the week ended July 29 showed the largest tonnage since the week of April 15, when the strike situation became serious in the Fayette county region. Merchant coke producers made a larger gain for the week than did furnace coke producers. The merchant operators have been the heaviest sufferers since the beginning of the strike and the gain last week is considered significant. Fuel production in the region increased 72,700 tons, an increase of 4030 tons over the preceding week.

Outside workers continue to be imported but here and there regular employees in the region are returning to their jobs at the old or at other plants. This does not apply to the element which has affiliated with union locals. These workers, now affiliated with the union, are, if anything, even more determined than ever to remain out. They have been told that the strike in the union fields will never be settled until the union in this field is granted recognition. Inasmuch as they stand little chance of being reinstated on employment lists at plants in the region, they apparently figure that their course is to hold out for union recognition.

With increased production, coal shipments naturally are increasing. The Pennsylvania Railroad, in the week of July 29, alone handled 4706 loads, an increase of more than 700 loads over the preceding week.

That the strikers are recognizing the situation as more serious from their viewpoint is indicated in the amount of dynamiting which has been carried out during the past week. No less than three railroad bridges on lines over which fuel shipments have been increasing were dynamited, although in no instance was traffic delayed more than 24 hr. Half a dozen or more homes have been dynamited.

No Allocation of Cars As Yet

Operation of Federal distribution through allocation of cars in the Fayette County field has not been instituted but the tentative organization is ready pending actual putting into force of these regulations by the government. Price control has not been put into

effect, with the result that coal is being sold for as high as \$8 a ton. Wagon mines in the county are exerting every effort to get out the maximum tonnage possible before the federal price fixing gets into operation.

Production in the Connellsville region, according to observers, will approximate 28 per cent of normal. The H. C. Frick Coke Co. is operating at around 33 to 35 per cent and this is being slowly increased. Efforts are being directed at increasing production as rapidly as possible. While a few of the idle workers in the region, as stated above, have returned to work, the majority of increased output is due to imported workers. When the actual break in the county situation will come is problematical.

Railroad Shopmen's Pay Higher Than in Private Plants

The National Industrial Conference Board, 10 East Thirty-Ninth Street, New York, has made a study of the wages of the striking railroad shopmen. Railroad skilled shop mechanics include machinists, boiler makers, blacksmiths, sheet metal workers, and electrical workers, whose duties in the railroad shops are practically identical with the duties of men employed in commercial foundries and machine shops. The report resulting from the investigation just completed covers the wages of 388,560 men employed in 1338 plants, or 73 per cent of all the wage earners in foundries and machine shops, as shown by the United States Census of Manufacturers in 1919. The statement estimates the average weekly earnings of skilled railroad mechanics to be \$33.67, under the reduced rates recently established by the Railroad Labor Board. The weekly wages of foundry and machine shop employees, however, on Jan. 1, 1922, were \$25.08, giving the railroad employees an advantage of 32 per cent in weekly earnings over the earnings of men performing identical work in the shops of private companies. Since a decline in wages of outside shop workers has taken place since the first of the year, the position of the railroad shopmen is even more favorable. The conclusion of the Conference Board's report, briefly stated, is this:

"Railroad shopmen are in a more advantageous position than they were in 1914, in three ways: First, that their hours of employment have been reduced, giving them more time for leisure and recreation; second, that their economic status, even under the new wage cuts, is 10 per cent higher than eight years ago; and third, that the average weekly wages of railroad shopmen are at least 32 per cent higher than those of men doing the same work but employed by other industries, where wages are regulated by the supply and demand for labor."

Coal Production Increased to 4,250,000 Tons

WASHINGTON, Aug. 8.—An increase of about 7½ per cent in the production of bituminous coal for the week of July 31 to Aug. 5, inclusive, is indicated by the weekly report of the United States Geological Survey. This was the eighteenth week of the coal strike.

Preliminary returns show a production for the week of 4,250,000 tons against 3,933,000 tons in the week before. The increase is due, the report states, to improved car supply in the Middle Appalachian fields rather than to reopening of mines hitherto closed by the strike.

In spite of the increase in bituminous output, the eighteenth week finds production still about 1,100,000 tons short of the level reached before the railroad shopmen's strike, for in the week ended June 24, 5,337,000 tons of coal were raised.

Production of anthracite in the week ended Aug. 5 will be barely 30,000 tons. The total of all coal, anthracite and bituminous, is therefore in round numbers 4,280,000 tons. In the corresponding week of 1921 7,320,000 tons of bituminous and 1,750,000 tons of anthracite were produced, making a total of 9,070,000 tons; and the rate the year before that was 11,283,000 tons. The

present rate of output is therefore from five to six million tons below normal.

Beehive Coke Production

There was but little change in the production of beehive coke during the last week of July. From reports of cars loaded by the principal carriers, it is estimated by the Geological Survey that the total output was 110,000 tons, an increase over the revised figure for the week preceding of 5000 tons.

Cumulative production for 1922 now stands at 3,625,000 net tons against 3,563,000 tons during the corresponding period in 1921, and 12,411,000 tons in 1920.

Revision of Coal Priority List

The Interstate Commerce Commission on Aug. 4 issued amendment No. 1 to its car service order No. 23. This amendment places in class 2 of the priority list all bituminous coal which has passed over screens of 4 in. or larger opening, coke and anthracite coal, to be shipped to retail dealers for household use. Class 4 is eliminated and a new class 4 is substituted therefor, reading as follows:

Class 4. Coal for the production and manufacture of foodstuffs and medicines and for the manufacture of containers therefor, for daily use but not for storage, exchange or sale.

This places tin plate mills, for example, within the class 4 priority, but it is doubtful whether there will be any coal for those in class 4 until production has been considerably increased.

Agents of the Interstate Commerce Commission to have charge of car service directions have been stationed at the following points: Thurmond, W. Va., S. J. Maywood; Bluefield, W. Va., B. S. Robertson; Huntington, W. Va., C. C. Semple; Norton, Va., W. L. Barry; Knoxville, Tenn., O. S. Reynolds; Louisville, Ky., H. M. Priest; Birmingham, Ala., J. B. Ford.

Ask Repeal of Illinois Miner Law

The Illinois Manufacturers Association and other commercial bodies are sending appeals to members of the Illinois State Legislature, asking them to call a special session in order to pass laws and repeal laws which at present bar any except experienced miners from working in Illinois coal mines. Workers now must have had two years experience to pass the examining board and it is charged that it is seen by the board that only union miners pass. It is urged that the law be annulled in view of a possible national emergency, which could not be advantageously met under the existing statutes.

Industry Retarded by Strikes

Advance information furnished by the Department of Commerce in connection with its Survey of Current Business supports previous conclusions regarding the retarding effect of labor difficulties on industry. So far, these disturbances do not seem to have affected the deeper undercurrent of returning prosperity. Production in many industries has been slowed down by these annoyances, but there is a general feeling that early settlements will be reached and that business will continue to gain in volume.

Freight Car Situation

WASHINGTON, Aug. 8.—The effect of the strike of railroad shop mechanics on the rolling stock of the railroads is noted in the latest report of the car service division of the American Railway Association. Although this report covers conditions only up to July 15, two weeks after the rail strike was called, there was an increase of 17,496 bad order cars during that period. Of the 2,258,267 freight cars on line 342,079, or 15.1 per

cent, were in need of repairs on July 15, compared with 324,583, or 14.3 per cent on July 1.

Freight cars idle on American railroads on July 15 totaled 417,029, compared with 405,120 on July 1, or an increase of 11,909 cars. Allowing 7 per cent as representing the normal number unfit for service would leave 184,000 as the number unfit for service and idle because of business conditions.

Pittsburgh Not Looking for Early End of Strikes

PITTSBURGH, Aug. 8.—Iron and steel and fuel interests here still hesitate about believing that there will be an early termination of the railroad and coal miners' strikes. So far as the coal strike is concerned, all signs now point to a finish fight, and it may be set down positively that the representation of Pittsburgh coal operators at the national conference scheduled to be held in Cleveland to-morrow will be no greater than at the attempted meeting in that city yesterday. Reports reaching here from Cleveland are to the effect that so little tonnage was represented at the meeting called by President John L. Lewis of the coal miners' union yesterday that it was adjourned almost as soon as it was called.

Considerable embarrassment has been caused the Pittsburgh coal operators by a meeting held here Sunday between A. M. Ogle, president National Coal Association, and Mr. Lewis, accompanied by attorneys. The result was the drawing up of a memorandum of agreement, the outgrowth of which is the idea of to-morrow's conference in Cleveland. To this it is hoped to attract operators from all over the country. Mr. Ogle, according to local coal operators having membership in the National Coal Association, has no authority as head of that organization to negotiate wage scales or other matters in the present dispute. His action, as well as other matters in connection with the strike situation, are believed to have been threshed out at a meeting held here to-day of the Pittsburgh coal producers' association.

Meanwhile, the coal situation in this part of the country as far as production is concerned does not change much. There has been no material falling off in the output of the mines, but the impression is so strong in the minds of striking miners that victory is at hand that efforts to reopen idle mines have not met with much success. Priorities in the distribution of coal thus far have not been very generally applied, chiefly because the machinery for enforcing them has not yet been set up. The result is that coal prices are largely on a supply and demand basis and no attention has been given the maximum suggested from Washington.

Steam coal from nearby fields to-day is selling at \$7.50 per net ton at mines, while by-product grade commands \$7.50 and lump gas coal is selling around \$8. The railroads seem to be making some progress in replacing striking shopmen, but operations still are more or less adversely affected by the poor condition of the equipment and of course by the inability of the railroads to secure full supplies of coal.

The issue in both the coal and railroad strikes is very clearly defined. Mine operators believe that they will be successful in the struggle if given sufficient time and the same thought is uppermost in the minds of the railroad executives. Whether the struggles will be allowed to go to a definite conclusion seems to hinge largely on the attitude of the Government. Business men generally hope that the Government will not interfere because they believe that at best only a partial settlement could be effected.

Strike at Chicago Rail Steel Mills

CHICAGO, Aug. 8.—Approximately 1000 mill hands have struck at the hard steel bar mills of the Inland Steel Co. and the Calumet Steel Co. at Chicago Heights, Ill. The strikers want a 20 per cent increase in wages. Both skilled and unskilled workers are out.

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ESTABLISHED 1855

THE IRON AGE

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Repeal the Immigration Act

In the matter of immigration our "open door" policy allowed us for many years to draw upon the manual labor of Europe's best types. But the quality of our immigration gradually deteriorated, as more backward peoples sought an asylum here, and a change in our "open door" law was called for but was not obtained. When the cumulative effect of our mixed immigration policy could no longer be ignored, not a few insisted upon a "closed door" policy; but these had no knowledge of our industrial dependency, and a temporary compromise was attempted in the 3 per cent Dillingham Law, the damaging effects of which are now clearly apparent.

Unfortunately the framers of this law took no account of the inferior industrial and mental quality of our more recent immigration. The result was—to the gratification of organized labor—that we deprived ourselves of needed additions to both our skilled and common labor. Under the law, the large body of non-industrial aliens in our midst has been unnecessarily increased. And now a two-year extension of the Dillingham law has been made without sufficient inquiry as to its results, and largely under pressure from those interested in creating a monopoly of jobs.

Taking the countries which supply nearly all the common labor used in the industries outside the needle trades, we gained in immigration over emigration in the ten months ending April 30, 1922, the almost negligible figure of 9813 adult persons of the class usually able to enter industry. But this is not the whole measure of damage done to our industries, which were regularly requiring and absorbing a quarter of a million adults annually, qualified for common labor. We actually lost some tens of thousands of good workers during these ten months, 25,000 in fact, and in addition 46,394 Hebrews entered under the Dillingham law in that time, while only 713 of the Jewish emigrant class left the United States. These Hebrews included women and children "of no occupation," who composed the majority and who quickly migrated to the already congested ghettos of a few larger cities, while the adult males who entered with them were largely of the needle trades in which we already had an over-

supply. This class of immigrants has refused, as a rule, to enter into other industries. The Dillingham law, therefore, places a continued penalty upon our former lack of discretion and upon our immigration policy based largely on sentimentality.

The maintenance of our common labor is basic and is an industrial necessity. There is, in fact, already a deficit in the common labor supply in various parts of the country which causes a real "restraint of trade" and of new enterprise. Many types of manual labor are needed in our agricultural and industrial territories and additions also to the body of our skilled craftsmen. The supply of this labor through immigration has been deliberately allowed to run down with the active aid of those interested in insuring that labor here shall have a high scarcity value.

Thus recruiting for the low manual jobs in the United States, which the average American worker for years has resolutely refused to perform is now left to politics and a freak law. The common labor which will fire the factory boiler, reap our harvests and "help" building tradesmen and skilled craftsmen in every line is absolutely necessary to normal operations. For many years it has been almost wholly supplied by immigration and is now at a minimum.

The immigration restrictions needed are these: An immediate repeal of the Dillingham 3 per cent law, the improvement of our general immigration code which at present makes it absolutely impossible to discriminate at any time in favor of the real labor needs of the country, and some emergency control of admission to the country which shall be legally operative whenever it is needed to mitigate the social effects of the trade depression or to prevent an immigrant "run" upon the United States during a crisis.

Commissioner W. W. Husband of the Federal Immigration Bureau declared last week at the Wellesley Industrial Conference that our policies of "open door," "closed door" and "percentage basis" were fundamentally wrong and insisted that when the United States is short of one kind of labor we should have laws which will permit us to handle the matter scientifically, laws which will allow us to pick and choose intelligently and

to obtain material that would surely develop into good American citizenship. The modification of the law should follow the example of Canada which has saved herself the dilemma in which we find ourselves by exercising a selection privilege at the place of origin. Canada ascertains the qualification for making good and certifies to it abroad, before issuing an embarkation permit, and does not leave it to chance and discovery after the entrant has been turned loose upon the country. Such a revision of our policy is not opposed to the traditional "spirit of America," but is calculated to make the lot of all those accepted and of their families more satisfactory than ever before.

Our population, foreign-born or with one or both parents of foreign birth, was 36,398,958 persons out of a total population of 105,710,620 at the census of 1920. That is, one-third of our people were of foreign origin. In view of this it is obvious that definite steps must be taken to insure the raising of the quality of our immigration, the continuation of which on the present basis of quality and quantity would lead to great impoverishment of the national intelligence and resources and corresponding damage to industry.

Coal Stocks and Coal Strikes

From one viewpoint it appears to be fortunate that the iron and steel industry has adopted the by-product coking process so extensively in recent years, for in this coal strike the stocks of coal at by-product ovens have helped greatly in maintaining the industry in operation. Were there no by-product industry, it might be argued, the iron and steel industry would have been affected much more seriously by the strike.

From a long range viewpoint there does not seem to be much in the argument. For decades we have had recurrent coal strikes and the whole thing seems to have developed long ago into a guessing contest. The coal consumers try to guess how long the strike will last, and lay in stocks accordingly, while the coal miners try to guess how long the stocks will last and make their preparation in corresponding manner. Each long strike added to the history of the industry induces both parties to make guesses of longer periods for the next strike.

At this time, when the coal strike has lasted for four months, it may well be asked whether the practice of stocking coal is doing any practical good. The consumer bears the expense of stocking. He pays in most cases an extra price for some coal during the strike. Afterwards he is likely to pay an extra price for coal by way of reimbursement to the coal miner for the time the miner has lost.

It has been urged repeatedly that coal consumers should stock coal in summer so as to take the peak off the load of the mines and the railroads in winter. Consumers have been indisposed to do this to any extent, presumably on account of the expense, and also because of a feeling that the risk of being without coal or of having to pay an extra price for a time is simply of the same order as other risks that business and industry must take.

If there is such objection to stocking coal

against winter, which is sure to come year after year, it may well be concluded that the stocking of coal against coal strikes is a serious burden upon industry. While that is a serious burden the other burdens involved in a coal strike are greater still. The practice of having a strike at the time of every wage scale settlement, or a "suspension" as the operation used to be termed, is so fixed that it will certainly require very definite and positive action to eliminate it.

In proportion to the value of coal, the cost of stocking is very considerable. While for years it has been preached that consumers should stock coal it may well be considered whether, after all, it would not be cheaper and more efficient to devise means whereby coal can be produced and moved just as it is required. We have become so accustomed to waste and inefficiency in the production and distribution of coal that the whole question needs to be considered afresh without bias from habits of thought already formed.

High-Test Iron Castings

Whether iron castings containing steel scrap are called "semi-steel" or "high-test iron" they have become recognized as a distinct product. Official sanction for the use of the term high-test iron was given by the American Society for Testing Materials at its annual convention in June when tentative specifications were adopted for cupola castings under this designation.

Opinions are divided as to the percentage of steel scrap that will produce the best results. It has been assumed too readily that almost any quantity up to 40 or 50 per cent is productive of good castings. The specifications referred to say nothing about the charge to be used, but deal largely with methods of testing. On other pages of this issue is a critical discussion of the proper percentages of steel scrap in cupola iron and the effect on the strength, carbon absorption and hardness. It is based on operations in a large Middle Western foundry which throw new light on the metallurgy of this interesting product. While 40 per cent of scrap in cupola charges seems to insure the strongest iron, there are reasons why 20 to 30 per cent represents the best working charges. Again, as to hardness and carbon absorption, anything above 40 per cent scrap avails nothing and, as with the strength, a deterioration follows.

Definite scientific data on the metallurgy of high-test iron, which afford a more scientific control of the cupola, are welcome. It may be that the looseness of nomenclature that gave the current designation of semi-steel is in part responsible for the evident latitude in practice which this metal has taken in the past 20 years. With the principles controlling its production better defined and with tests prescribed as in the specification lately sanctioned it should take a place of even larger importance among high-grade products of the foundry.

Never in the history of American iron and steel exports has there been so large a movement in black steel sheets as in the past few months. We have referred before to the remarkable demand from Japan, which began to attract

attention a year ago. For the eleven months ended with May, Japan took about 83.75 per cent of the total exports of sheets, the actual figures being 516,774,613 lb. (230,703 gross tons) out of 617,143,078 lb., or over \$17,500,000 worth. No other American steel product has approached this record in the same eleven months. In 1913 the foreign sales of sheets were insignificant and the present movement compares well with some of the war exports of steel for munitions. New building laws in Japan requiring the use of metal in place of the highly inflammable materials hitherto used, are the chief cause of this large demand.

Viewpoints of Old and Young

There have been various times when the views of old men and young men as to industrial and business matters differed fundamentally by reason of the difference in conditions in the periods in which the two groups received their training and formed their philosophies of affairs.

Approximately seven years have elapsed since commodity prices and wage rates began to mount as a result of war conditions. In those seven years many new workmen have come into the field and many young men have risen to positions of responsibility. The time is long enough for these graduates to constitute a considerable part of the whole body, and some of the things that older men consider curious in present-day conditions are explained by that fact.

In a valuable monograph published a year ago, "Price Changes and Business Prospects," Leonard P. Ayres, vice-president of the Cleveland Trust Co., emphasized the difference in philosophy between men who received their business training after the year 1896 and those who flourished in the preceding 30 years. From the Civil War to 1896 the general trend of prices was downward. Afterwards the general trend was upward. The early generation was trained to conservatism and learned the evil of issuing bonds. The later generation was trained in optimism and learned how profits could easily be made by issuing bonds. In 1896 there were "bloated bondholders." Later, the bondholder became a victim of the high cost of living.

In 1916 boys in their teens were given jobs at wages double what their fathers had been able to earn at double the age. Now they are men six years older and seriously believe high wages for performing relatively simple operations are perfectly natural and must be striven for. The beginners of 1917 are five years older. Altogether the respective classes count up. These young men do not know what hard work is, and as to striving, the chief idea in many cases is a strike. If older men endeavor to point out that the viewpoint is wrong, that these stripplings cannot reasonably expect to thrive so easily, the counsel is treated with indifference or contempt. The elders are "old fogies" and have not kept up with the times.

At various times since the armistice it has been said in substance that the will to work, to work efficiently and industriously and for reasonable wages, would not be restored until industry had passed through a depression. In

the past few months the remark has been that the depression of 1921 has not produced the expected results, and it has been asked whether the trouble is that it was not long enough or was not deep enough. When one divides the workers into the two classes—on the one hand those who knew the ups and downs of business before the great war and appreciate that there must be hard work in order to succeed at all, and on the other hand those whose whole experience has been accumulated in the past seven years, he will have strong suspicions that the older men need no additional experience, but that the younger men have had no real experience at all. To them 1921 may appear simply as a curious vacation period, an unexplained interruption that merely needs to be forgotten.

That American vessels are fast falling behind in the struggle for ocean supremacy is becoming increasingly apparent from reports, month by month, of the Department of Commerce. For the eleven months ended with May foreign vessels brought in 68 per cent of our imports, while American vessels accounted for only 32 per cent. This compares with 41 per cent in American vessels for the eleven months ended with May, 1921, and 59 per cent for foreign vessels. While the present share of American carriers in American commerce is a great improvement over pre-war years, the figures do not show the 50 per cent participation which might be considered normal. It is interesting to note that about 100 years ago American vessels carried as much as 90 per cent of the total, and in 1910, the low record year, less than 10 per cent.

Probably for the first time on record France is producing more pig iron than Great Britain. It would at least be necessary to search the records of normal production during many years to find a parallel, if one exists. In May France produced 435,300 gross tons of pig iron against Great Britain's 407,900 tons, and that was the third month this year in which the balance was in favor of France. In the first five months of this year the French production averaged 362,400 tons, while the British average was only 356,000 tons per month. In 1913 and in 1920 the British output was more than double that of France. A British authority states that export business with Germany and activity in the building trades are the main reasons for the improvement in the French industry. Before the war Great Britain led the world as an exporter of pig iron, but thus far this year the movement has been less than half what it was in 1913.

Iron Age Index

The index of THE IRON AGE for the past half year, January to June inclusive, has been compiled and printed and is now ready for distribution. It will be forwarded promptly to those who have entered their names on our list as desiring it. Others who may have use for copies will be furnished them by addressing our Circulation Department.

MAHONING VALLEY CONDITIONS

Curtailment of Operations—Pig Iron, Semi-Finished and Finished Steel Markets

YOUNGSTOWN, OHIO, Aug. 8.—In the Youngstown district, the Youngstown Sheet & Tube Co. has suspended a second blast furnace in its East Youngstown group, its Bessemer department, one blooming mill and two open hearth furnaces. At its Farrell, Pa., plant, the Carnegie Steel Co. has banked Nos. 1 and 3 blast furnaces and has suspended its steel department, consisting of 12 open hearth furnaces, blooming and bar mills. The Republic Iron & Steel Co. has cut the number of its active open hearth furnaces to eight and but one skelp mill at its Brown-Bonnell plant is rolling.

Active blast furnaces in the Mahoning Valley have been reduced to 10, as follows: Carnegie Steel, five of six at its Ohio Works; Youngstown Sheet & Tube Co., two of four at East Youngstown, and Republic Iron & Steel Co., Sharon Steel Hoop Co., and Brier Hill Steel Co., one each. On July 1, when the railway shopmen's strike started, 18 furnaces were active in the Valley.

Independent steel making has been reduced to 36 of 51 open hearth furnaces. Sheet mill production is being sustained, however, as 106 sheet mills were scheduled at the beginning of the week. Non-integrated sheet rollers say their sheet bar supplies are sufficient for maintenance of rolling at a normal rate until September.

The Sheet & Tube company is operating but one of six batteries of by-product coke ovens, the output being sufficient for one blast furnace. It is planned to suspend a second stack as soon as coke stocks are exhausted and conserve coal for finishing mill uses. The company has sufficient semi-finished steel on hand to maintain rolling mill operations through August.

Production Cost of Steel Up \$15 a Ton

Coal is not now available for the industry, states President James A. Campbell, adding that it would be impossible to pay prevailing prices without advancing prices of steel products. In the production costs of the higher finished steel products, advanced fuel costs add at least \$15 per ton, he states. There has been of course no proportionate advance in steel prices. Higher prices in general for steel products are predicted by Mr. Campbell when the industry again reaches normal. Continued scarcity of coal, following adjustment of current labor disputes, is predicted for the industry, tending to keep prices up and adding to production costs of iron and steel.

Whereas the Sheet & Tube company consumes under normal operations an average of 135 cars daily, its receipts dropped to 11 cars one day last week and 35 another. Much of the coal coming into this territory is of indifferent quality.

Market for Finished Steel

Automobile interests continue to press for delivery of sheets, especially on full finished sheets and strip steel. There is little surplus fine finished sheet stock available in this district, as the chief maker is fully engaged on orders from regular trade channels. It is pushing the installation of six additional mills at its Newton Falls plant.

Bars, plates and shapes are moving toward a 2c. minimum. The chief independent merchant bar interest is out of the market and is falling behind in its obligations to customers, due to interruptions to production. In this territory, strip steel is quotable at 2.60c. to 2.75c. for hot-rolled, while cold finishes are being quoted at 4.25c., an advance of \$5 per ton over recent levels.

In the pipe market, demand exceeds ability of makers to produce under present conditions, and is exceptionally marked for butt-weld sizes. Difficulties in production due to coal shortage are assuming serious proportions, and it is unlikely the present rate of operations can be long maintained.

The leading independent producer of wire products

again curtailed output this week and is out of the market, in so far as new commitments are concerned. Though nominally quoting nails at \$2.50 per base keg, such business has been accepted for some time at \$2.40. Prices of nails and of plain wire at \$2.25 are declared prohibitively low by this interest.

Brier Hill Steel Co. continues to quote from 2c. to 2.40c. for plates, but is accepting only 84-in. mill sizes. A district fabricating interest is figuring on plate work for a power house installation in Massachusetts requiring 2200 tons of plates for fabrication into smokestacks, boilers and the like. An independent has been negotiating for resale of 90,000 lb. of small squares of forging steel quality, now in a warehouse in Massachusetts.

District interests do not expect priority regulations of the Interstate Commerce Commission to affect coal already loaded and consigned to them, prior to issuance of the order.

Virtually no pig iron is being offered for sale in the Mahoning Valley, due to cutting down of the number of active furnaces and prevention of operation by merchant stacks which had planned to start. One interest whose operations may permit small surpluses to be sold says it will adhere to a \$27 minimum for standard basic iron. Another independent is using a considerable tonnage of off-grade basic, which has been lying in its yards for several years, to meet the current emergency.

All grades of semi-finished steel are held at \$35, with little merchant tonnages available except to regular customers. In current rollings, production of sheet bars is considerably ahead of slabs or billets. Already there has been a curtailment in supplies going to non-integrated rolling interests, and sheet production will sooner or later be adversely affected as these supplies are diminished.

The Girard plant of the A. M. Byers Co., Pittsburgh, producers of wrought iron pipe, opened Monday with 30 puddling furnaces fired, of 88, and one skelp mill rolling, but planned to suspend entirely before the week-end. Two light bar mills, which were active last week at the Brown-Bonnell works of the Republic Iron & Steel Co., are idle this week.

Improved Car Movements

During the first five days of August the average daily loaded car movement in the Youngstown district was 15 per cent greater than during corresponding period in July, and 20 per cent ahead of the same period in August, 1921. Considerable improvement has been effected in freight movement of the Baltimore & Ohio Railroad, which was the worst hit of any of the carriers serving this territory.

July wage distribution through banks was \$4,226,181, a decline of \$461,795 from the preceding month. July is the first month of the year to fail to show a gain over its predecessor. The decline is attributed to loss of employment resulting from the coal and rail strikes. The July disbursement, however, compares with a payroll of \$3,323,982 in July, 1921, the low point in the post-war depression.

Higher labor costs are predicted by some interests. During the summer, until the shopmen's strike precipitated intermittency of employment, labor shortage was felt by most plants, especially at sheet mills. Workers have been attracted from the steel industry to other forms of employment.

The International Harvester Co., Chicago, has let a contract for a one-story open hearth works for the Wisconsin Steel Co., One Hundred and Sixth Street and Torrence Avenue, to cost \$360,000. The building will be 143 x 504 ft. The company has also awarded a contract for a one-story storage building for steel, 103 x 400 ft., to cost \$80,000.

David Evans & Co., 3720 South Kedzie Avenue, Chicago, has opened a scrap iron and steel department in charge of Charles J. Reagan, formerly with Briggs & Turivas. David Evans & Co. has been in the pig iron, coke and ferroalloy business for 22 years and is well known in the iron and steel trade.

Iron and Steel Exports Fall Again

Drop 8 Per Cent Below May, But June Shows Larger Than Any Other Month Since March, 1921—Fiscal Year Less Than Half the Previous Year

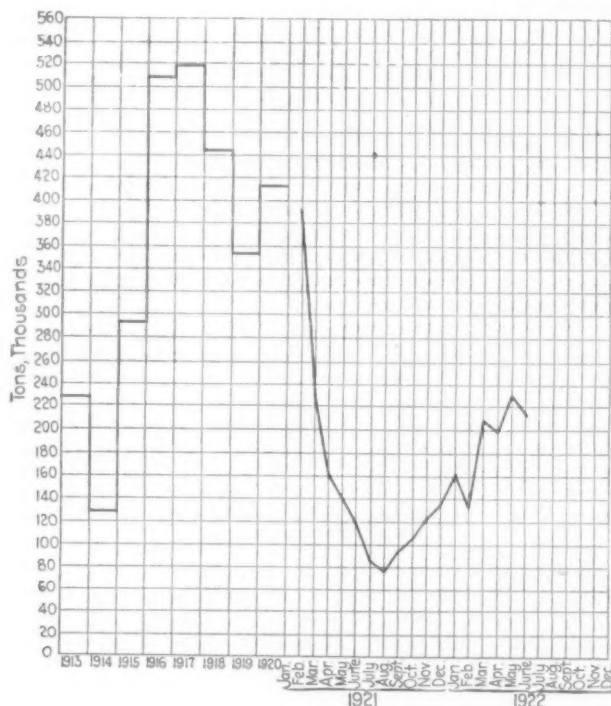
WASHINGTON, Aug. 8.—Reflecting a substantial decline, iron and steel exports for June aggregated 212,295 gross tons, valued at \$18,649,816 as compared with 230,062 tons valued at \$29,456,348 in May. For the fiscal year 1922 ended with June, exports totaled 1,721,418 tons valued at \$181,798,042 as compared with 4,168,619 tons valued at \$608,541,550 for the fiscal year ended with June, 1921.

Exports of machinery, exclusive of vehicles, for June, were valued at \$23,554,356, as compared with \$19,415,994 for May. For the fiscal year ending with June they were valued at \$245,946,681. For June of

paring with 23,093 tons valued at \$2,966,332 for May. The chief increases in manufactured imports were made in ferromanganese, which amounted to 13,535 tons in June, and in scrap, which amounted to 10,000

Exports, January, 1920, to May, 1922, inclusive

	All Iron and Steel	Gross Tons Pig Iron	Semi-finished Material
Calendar year 1919....	4,239,837	309,682	258,967
January, 1920	333,601	18,468	19,927
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,379
June	402,707	17,075	29,811
Fiscal year 1920....	4,212,732	248,126	288,766
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,042
December	498,765	10,055	3,415
Calendar year 1920..	4,961,851	217,958	216,873
January, 1921.....	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	678
May	142,551	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921....	4,168,619	129,541	82,549
July	86,523	2,744	363
August	75,827	2,424	2,447
September	95,169	3,078	1,318
October	106,582	2,830	153
November	122,290	1,299	1,869
December	134,415	2,550	250
Calendar year 1921..	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,683
February	133,975	1,430	6,627
March	208,843	2,724	10,002
April	198,830	2,750	9,376
May	230,062	3,897	13,091
June	212,295	1,996	13,178
Fiscal year 1922....	1,721,418	28,330	63,127



Monthly Exports of All Iron and Steel from United States. The horizontal lines at left show, in each case, the average month of the year indicated. The curve at right shows the movement during the past 18 months

last year machinery exports were valued at \$31,860,156 and for the fiscal year ending with June, 1921, at \$593,042,511.

In contrast to the downward trend of iron and steel exports in June, there was a sharp increase of imports, which totaled 39,155 tons, valued at \$3,717,093, com-

tons. For the fiscal year ended with June, 1922, iron and steel imports totaled 186,186 tons, valued at \$29,660,540. For the fiscal year ended with June, 1921, imports totaled 244,164 tons, valued at \$44,236,077. Imports of manganese ore in June totaled 44,329 tons, valued at \$310,529, as compared with 46,517 tons in May, valued at \$307,571. For the fiscal year ending in

Imports of Iron and Steel—Gross Tons

	June 1921	June 1922	Year End'g June 1921	Year End'g June 1922
Ferromanganese	265	13,535	43,197	30,799
Ferrosilicon	520	1,518	7,361	11,011
Pig iron.....	3,688	5,850	61,757	40,472
Scrap	1,372	10,000	82,657	50,969
Steel bars.....	116	914	4,293	5,399
Bar iron.....	33	268	3,815	2,919
Structural steel.....	72	154	1,394	1,525
Billets, without alloys....	245	47	995	11,010
All other billets.....	51	128	3,216	1,069
Steel rails.....	2,585	6,586	37,583	29,105
Sheets and plates.....	48	29	2,781	334
Tin and terne plates.....	26	64	503	356
Wire rods.....	24	62	4,612	1,218
Total	9,045	39,155	244,164	186,186
Manganese ore and oxide..	17,169	44,329	682,770	257,208

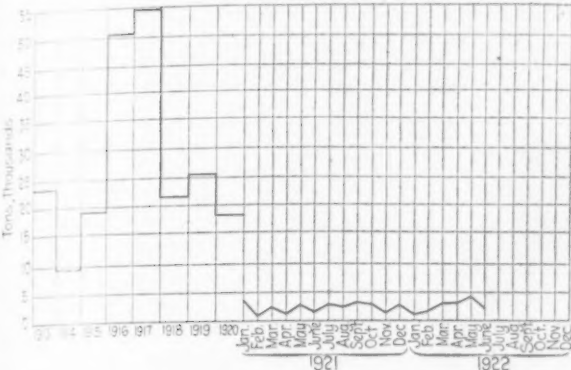
June, 1922, manganese ore imports totaled 257,208 tons. For the corresponding period of last year they amounted to 682,770 tons.

Of the total June imports practically all, as is shown by an accompanying table, came from the United Kingdom and Canada, the former shipping 18,882 tons and the latter 14,481 tons to the United States. Im-

Exports of Principal Steel Products for June, 1922, by Countries		
	Gross Tons	Per Cent of Total
Black Steel Sheets:		
Japan	18,071	75.9
Canada	3,453	...
Argentina	761	...
Tin Plate:		
British India.....	3,393	41.6
Japan	1,949	...
Canada	1,012	...
Steel Rails:		
Japan	26,114	59.8
Canada	5,112	...
Mexico	4,797	...
Galvanized Wire:		
Japan	3,225	...
Argentina	2,212	...
Canada	1,254	...
Philippine Islands....	1,223	...
Barbed Wire:		
Argentina	2,923	...
Brazil	1,524	...

ports from Belgium totaled 3750 tons and from Germany 224 tons.

Examination of the June exports shows that the decline was applied to practically all of the important steel products. It was particularly noticeable in the case of black steel sheets, exports of which for May



Monthly Exports of Pig Iron from United States. The horizontal lines at left show average month for each year. The curve at right shows the movement during 1921 and 1922

totaled 34,619 tons as compared with only 10,296 tons in June. In this connection it is interesting to observe that, while Japan continues to be the largest single buyer of American iron and steel, shipments to that

Exports of Iron and Steel—Gross Tons

	June		Twelve Months Ending June	
	1921	1922	1921	1922
Pig iron.....	1,637	1,996	125,629	28,330
Ferromanganese	55	55	3,335	1,021
Ferrosilicon	52	58	577	463
Scrap	3,587	8,739	182,478	60,875
Ingot, blooms, billets, sheet bar, skelp.....	1,106	13,178	82,549	63,127
Iron and steel bars.....	8,335	19,084	507,747	102,190
Alloy steel bars*.....	229	229	4,673	4,673
Wire rods.....	492	3,565	61,567	41,123
Plates, iron and steel....	7,781	9,844	761,022	119,851
Sheets, galvanized.....	2,942	10,628	93,155	82,172
Sheets, black steel.....	10,296	23,823	155,841	299,328
Sheets, black iron.....	948	721	22,722	6,639
Hoops, bands, strip steel	1,302	3,032	38,405	25,033
Tin plate, terne plate, etc.	2,727	8,160	178,299	78,551
Structural shapes, plain material	18,058	6,023	526,482	113,224
Structural material fabricated	1,951	2,380	32,089	23,281
Steel rails.....	20,308	43,672	549,558	240,162
Rail fastenings, switches, frogs, etc.....	699	5,378	14,219	23,962
Boiler tubes, welded pipe and fittings.....	26,074	18,718	444,705	161,857
Cast iron pipe and fittings	4,076	1,686	54,183	26,377
Plain wire.....	2,569	11,283	167,898	83,840
Barbed wire and woven wire fencing.....	1,757	8,825	86,936	42,363
Wire cloth and screening*	170	170	1,622	1,622
Wire rope and cable*....	333	333	12,312	12,312
Wire nails.....	951	4,675	67,017	51,286
All other nails and tacks	226	913	13,088	7,126
Horseshoes	32	50	1,505	703
Bolts, nuts, rivets and washers, except track..	1,175	1,868	37,613	14,620
Car wheels and axlest..	1,986	1,986	18,178	18,178
Iron castings†.....	729	729	15,233	15,233
Steel castings†.....	97	97	11,249	11,249
Forgings†.....	387	387	11,262	11,262
Machine screws†.....	10	10	185	185
Total	119,081	212,295	4,168,619	1,721,418

*Not reported separately, prior to January, 1922.
†Previous to January, 1922, reported by value only.
‡Six months, only.

country showed a decided drop in June as compared with May. Of the exports of 43,672 tons of steel rails, the greatest export item, Japan took 26,114 tons. Of

Sources of June, 1922, Imports of Iron and Steel

Countries	Tons
United Kingdom.....	18,882
Canada	14,481
Belgium	3,750
Germany	934
Sweden	831
Italy	104
Virgin Islands of U. S.....	75
France	72
Austria	23
Norway	2
Czechoslovakia	1
Total	39,155

the total of 23,822 tons of black steel sheets, the next to largest item of exports in June, Japan took 18,071 tons.

Will Hold Exhibition of Machine Tools

A second annual exhibition of machine tools and appliances will be held under the joint auspices of the New Haven branch of the American Society of Mechanical Engineers and the department of mechanical engineering of Yale University, in Mason Laboratory, New Haven, Sept. 21 to 23.

The original purpose of the exhibition was to bring before the manufacturers of Connecticut and engineering students of the University the latest developments in machine tool practice. This year the purpose has been broadened with a view to contribute to the stimulation of industry and the restoration of prosperity. About 150 invitations to exhibit have been issued.

There will be no charge for exhibition space and no admission fee for spectators. Papers will be read each evening by authorities on the subjects treated, and it is expected that several exhibitors will show motion pictures of their machines, as well as having representatives present to demonstrate them. The exhibition chairman is H. R. Westcott, Westcott & Mapes, Inc., 207 Orange Street, New Haven.

MACHINERY EXPORTS
By Value

	June, 1921	June, 1922	Twelve Months Ending June, 1921	Twelve Months Ending June, 1922
Locomotives.....	\$4,254,474	\$783,170	\$46,567,683	\$18,133,922
Other Steam Engines.....	298,401	298,401	1,361,900	1,361,900
Boilers.....	209,263	154,358	8,893,878	1,506,133
Accessories and Parts.....	125,992	53,982	536,018	536,018
Automobile Engines.....	831,401	831,401	2,662,803	3,955,569
Other Internal Combustion Engines.....	595,775	510,228	10,435,325	3,266,931
Accessories and Parts for.....	713,807	225,567	1,342,338	1,342,338
All Other Parts of Engines.....	20,363,872	20,363,872	13,251,595	13,251,595
Complete Tractors, except Agricultural.....	119,124	9,674	19,792,732	266,954
Electric Locomotives.....	252,771	825,753	11,339,190	11,339,190
Other Electric Machinery and Apparatus.....	2,266,675	751,356	36,273,139	15,527,171
Powering Machinery.....	124,573	124,573	710,339	710,339
Concrete Mixers.....	41,102	32,243	1,024,026	398,234
Road Making Machinery.....	81,447	1,182,183	1,414,539	1,414,539
Elevators and Elevator Machinery.....	189,578	2,124,897	1552,821	1552,821
Mining and Quarrying Machinery.....	1,704,881	568,726	21,620,815	5,358,265
Oil Well Machinery.....	590,837	590,837	2,273,191	2,273,191
Pumps.....	827,624	16,804,060	1,045,209	1,045,209
Lathes.....	131,140	68,580	335,628	335,628
Boring and Drilling Machines, Planers, Shapers and Slotters.....	52,280	52,280	148,021	148,021
Bending and Power Presses.....	31,531	31,531	239,325	239,325
Gear Cutters.....	15,937	15,937	37,303	37,303
Milling Machines.....	51,622	51,622	158,645	158,645
Shaping Machines.....	6,678	6,678	27,268	27,268
Thread Cutting and Screw Machines.....	17,290	17,290	86,835	86,835
Planing and Shearing Machines.....	20,685	20,685	96,569	96,569
Power Hammers.....	3,162	3,162	55,798	55,798
Rolling Machines.....	585	585	24,504	24,504
Wire-drawing Machines.....	3,152	3,152	7,226	7,226
Polishing and Burnishing Machines.....	894	894	9,688	9,688
Sharpening and Grinding Machines.....	60,499	69,297	2,576,498	832,708
Other Metal Working Machinery and Parts of.....	1,296,574	813,229	26,488,232	6,952,320
Textile Machinery.....	1,045,095	1,385,904	23,513,228	17,469,311
Sewing Machines.....	483,820	1,012,065	11,280,128	5,727,922
Shoe Machinery.....	110,675	81,981	2,802,105	997,475
Flour-Mill and Gristmill Machinery.....	58,192	80,659	2,238,374	1,036,997
Sugar-Mill Machinery.....	1,596,972	494,532	29,108,909	4,392,269
Paper- and Pulp-Mill Machinery.....	108,908	3,562,585	11,376,074	11,376,074
Sawmill Machinery.....	54,941	23,418	1,392,454	570,287
Other Woodworking Machinery	110,653	109,570	3,835,711	1,092,783
Refrigerating and Ice Making Machinery.....	102,631	166,123	3,390,763	1,866,823
Air Compressors.....	292,807	245,855	5,675,504	1,995,381
Typewriters.....	723,797	1,012,065	18,867,513	10,395,623
Power Laundry Machinery.....	56,477	41,899	1,139,309	551,717
Typesetting Machines.....	166,136	369,560	4,536,013	3,415,798
Printing Presses.....	375,004	227,293	10,383,632	4,694,510
Agricultural Machinery and Implements.....	3,262,641	1,821,264	51,344,292	19,055,581
All Other Machinery and Parts	10,316,108	11,455,170	194,203,834	101,056,573
Total.....	\$31,860,156	\$23,554,356	\$593,042,511	\$245,946,681

*January 1, 1922, to June 30, 1922.
†July 1 to December 31, 1921.

DIE-CASTING MACHINE

Automatic Unit for High Production—Simultaneous Casting of Different Work a Feature

An automatic die-casting machine designed to effect a high rate of production of die-castings has been placed on the market by the W-J Die-Casting Machine Co., 24 North Wabash Avenue, Chicago.

The new machine is of the continuous rotary type,

four sets of cages, arranged to carry dies of any form, being mounted on a rotating table. Two melting pots on opposite sides of the table charge the molten metal to each die as it passes the pots. In the machine illustrated two of the die cages have been removed from their places on the table to permit a better view of the mechanism and, as shown here, the melting pots are not in their cases on the slides which extend from the base of the machine. Eight castings are produced in each revolution of the table, or two in each of the four dies. At the rate of 2 r.p.m., the production would be 960 castings an hour. A feature of the machine is that different types of castings may be produced simultaneously by using different dies.

As the dies approach the melting pot they are automatically closed, and the pot advanced to them. A nozzle on the pot enters a socket on the die, which is then filled with molten metal from the pot either by means of compressed air or by the action of a plunger. After the pots have been advanced to a die, they rotate with it long enough to permit sufficient metal to be forced into the die. The mechanism which actuates the melting pots provides both a rotary and in-and-out motion.

The pot then recedes, the die opens and the core pins withdraw. The casting is pushed from the upper die member by a knockout pin and falls upon a tray that is automatically brought in place to receive it. The table continues to rotate and a pair of revolving brushes loosens the dirt adhering to the dies, compressed air being then blown on the die members to remove foreign matter remaining on the die faces. On approaching the second melting pot the operations outlined are repeated.

The die is in two parts, the upper member being movable and the lower stationary. Closing the upper members on the lower, preparatory to the actual casting operation, is effected by means of the upper of the two cams shown on the post at the center of the machine. The rollers which run in the upper grooves are fastened to rods attached to the upper dies. As the dies approach a melting pot its roller runs down a decline in the groove, causing the upper die to be pushed down on the lower one. At the same time the roller in the lower groove proceeds down the decline provided for it, this roller pushing the core pins into the four sides of the upper die, this being accomplished through a sleeve and a link mechanism.

In the case of vertical core pins they are pushed straight down through the die. Adjustment is provided for varying the distance each core pin is advanced into the die. Core pins may also be introduced into the lower die member. On the table station a plate cam having four spiral grooves is mounted, each of the cams being carried on a stem projecting through

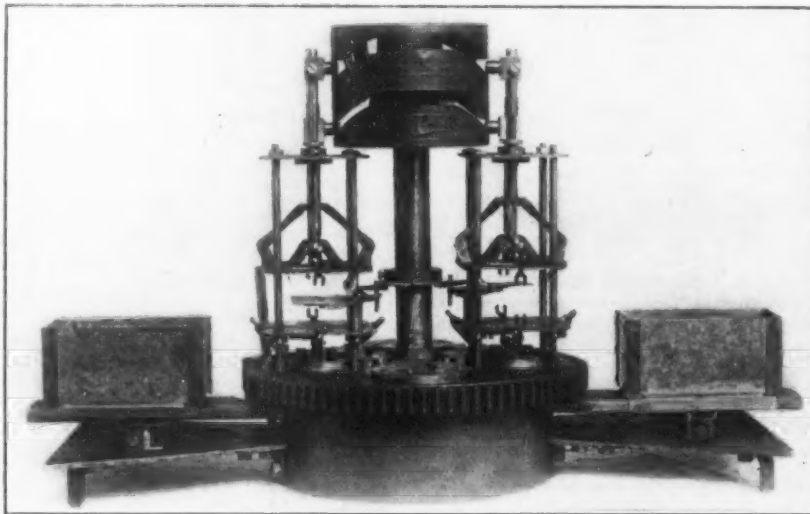
the table and provided with a lever. This lever strikes a dog as the table rotates, which causes rotation of the cams. The pins which run in the cam grooves are guided at their lower ends by straight grooves. As each pair of pins slides into its groove, a link is rocked, pushing a core-pin into the lower die. There are four sets of rocking links to provide for introducing a core pin into the four sides of the die.

The dies are kept at the proper temperature by circulating water. Heating of the metal in the pots is by means of gas jets, gas flames being provided also for pre-heating the compressed air used in forcing molten metal into the dies.

In some cases a plunger and cylinder are used to force the molten metal to fill the dies completely. Under such circumstances it becomes necessary to prevent the metal from solidifying in the cylinder, this being done by heating the cylinder and plunger with a gas flame.

To meet the requirements of small shops the

machine illustrated may be provided with one melting pot and two sets of dies.



Four Sets of Cages on the Rotating Table Carry the Dies. The two melting pots are located opposite each other

Trade Commission and Steel Mergers

WASHINGTON, Aug. 8.—The Federal Trade Commission is still engaged in studying the facts and figures relating to the proposed consolidation of the Midvale Steel & Ordnance Co., Republic Iron & Steel Co. and Inland Steel Co., and no information is yet obtainable as to whether a complaint will be issued in this case. The data now being compiled in the office of the trade commission will doubtless be presented soon to the commissioners, who will then decide what further action, if any, is to be taken.

In the Bethlehem-Lackawanna case, in which a complaint was issued some time ago, no date has been set for hearings and this probably will go over until after the summer vacation period.

Mesabi Iron Co. Expansion

In connection with a recent offering in New York of 50,000 shares of common stock of the Mesabi Iron Co., it was stated that the company plans to increase materially the output of its iron ore concentrating and sintering plant on the eastern Mesabi range. The present capacity is 500 tons of sinter per day, but the coarse crushing plant, power plant and other installations are sufficient to handle a much increased tonnage. It has been estimated that on the production basis of 3500 tons of sinter per day the cost will be approximately \$2.60 per ton. The Midvale Steel & Ordnance Co. has a 32 per cent interest in the company's common stock.

Molybdenum and Other Alloy Steels

In the study of molybdenum and other alloy steels, being made by Dr. H. W. Gillett at the Ithaca, N. Y., office of the Bureau of Mines, 600 endurance test pieces have been ground and polished to a special mirror finish ready for testing. These bars will keep two endurance machines busy night and day for probably more than a year.

FABRICATED STEEL BUSINESS

Bridge and Building Awards and Tonnages Pending at Leading Centers

Awards for fabricated steel work for the past week include the following:

Department store at Poughkeepsie, N. Y., 700 tons, to McClinton Marshall Co.

Mount Holyoke College, South Hadley, Mass., 700 tons, to American Bridge Co.

Queensboro Plaza, New York, approach work, 500 tons, to American Bridge Co.

United Lead Co., Perth Amboy, N. J., 600 tons, to Levering & Garrigues Co.

Highway bridge, near Buffalo, N. Y., 575 tons to American Bridge Co.

Bridge work for New York Central Railroad, 200 tons, to Shoemaker-Satterthwaite Bridge Co., and 150 tons to Fort Pitt Bridge Works.

Bridge for Norfolk & Western, 150 tons, to Virginia Bridge & Iron Works.

Young Men's Hebrew Association, Newark, N. J., 800 tons, to American Bridge Co.

Standard Oil Co., 33 80,000-bbl. oil storage tanks for Casper, Wyo., 10,000 tons; 25 tanks to American Bridge Co. and 8 tanks to Chicago Bridge & Iron Works.

State Capitol Building, Lincoln, Neb., 2100 tons, to Omaha Steel Works.

Pullman Co., foundry building, Pullman, Ill., 1000 tons, erection to W. B. Kilgore Construction Co.; fabrication to Gage Structural Steel Co.

Power house for Indianapolis, 180 tons, to Helperington & Bernier.

State bridge No. 3252 at Deer River, Minn., 119 tons, to American Bridge Co.

Bridge 1041, St. Louis County, Minn., at Hibbing, 294 tons, to American Bridge Co.

First National Bank building, Fort Wayne, Ind., 800 tons, to Whitehead & Kales.

Building for American Shipbuilding Co., 500 tons, to Republic Structural Iron Works, Cleveland.

Addition Jamestown Worsted Mills, Jamestown, N. Y., 150 tons, to Kellogg Structural Steel Co., Buffalo, N. Y.

Power house, J. N. Adam Memorial Hospital, Perrysburg, N. Y., 200 tons, to Kellogg Structural Steel Co., Buffalo.

High school, Elmira, N. Y., 100 tons, to Kellogg Structural Steel Co., Buffalo.

New Riverside pumping station, Milwaukee, 438 tons, to Worden-Allen Co.

Structural Projects Pending

Inquiries for fabricated steel work which may be added to lists of pending projects include the following:

Apartment house, Philadelphia, 1000 tons.

Highway bridge for New York, Saratoga, 600 tons.

Bridges for New York Central, 400 tons.

Addition to Chelsea Hotel, Atlantic City, N. J., 3000 tons, plans to be issued in about a week.

Bankers Reserve Life Insurance Building, Omaha, Neb., 700 tons.

Ford Motor Co. Building, River Rouge, 900 tons.

Louisiana & Arkansas Railroad, 650 tons of bridge work.

City of Seattle, bridges, 1800 tons.

Court house, Akron, Ohio, 250 tons.

Bridge for Spokane, Wash., 2000 tons, bids being taken.

Kimberly-Clark Paper Co., Niagara Falls, N. Y., 300 tons.

Spaulding & Son Paper Co., Tonawanda, N. Y., 200 tons. Clapp Estate, Portland, Me., seven-story office building, 500 tons.

Lima Locomotive Works, Lima, Ohio, 1700 tons, general contract to James Stewart & Co.

Municipal viaduct at Atlanta, Ga., 1200 tons, bids close Aug. 23.

Office building at Charlestown, W. Va., tonnage unstated, Mills, Millsbaugh & Carmichael Co., Columbus, Ohio, architects.

Buildings for new fair grounds at Huntington, W. Va., tonnage unstated, Joseph & Joseph, Louisville, Ky., architects.

Railroad Equipment Business

Locomotive purchases in July were the largest for any month this year, the total having been fully 350. The best previous month was April with about 275. The largest order was that of 150 by the New York Central, noted last week.

In freight cars, according to the *Railway Age*, July was a large month with a total of 15,675 cars, bringing the total to Aug. 1 to 103,847 cars. Passenger cars ordered in July were 120, making the total for the seven months 1352.

Inquiries for new locomotives and cars as well as repair activities continue, among which are the following:

The Baltimore & Ohio, reported as inquiring for 15 Pacific type locomotives, has ordered this equipment from the Baldwin Locomotive Works.

The Chesapeake & Ohio will receive bids until 12 o'clock noon Aug. 25 at Richmond, Va., for general repairs to 50 locomotives. This company is also asking for bids until Aug. 11 on the repair of 50 locomotives.

The Buffalo, Rochester & Pittsburgh Railroad is inquiring for 40 locomotives.

The Chicago & Northwestern has let repairs on 500 box cars to the American Car & Foundry Co.

The Fruit Growers Express is inquiring for 1000 refrigerator cars.

The Northern Pacific has ordered 1000 center construction from the Western Steel Car & Foundry Co.

The Chesapeake & Ohio has awarded 50 refrigerator cars to the American Car & Foundry Co.

The Wilcox Co., Chicago, has awarded 50 hopper cars of 15-ton capacity to the Western Steel Car & Foundry Co.

The Indiana Gas & Coke Co. is inquiring for repairs on 10 hopper cars.

The Chicago, Burlington & Quincy is in the market for 10 to 1500 box car repairs.

The Boston & Maine is having 1000 box cars repaired at the shops of the Laconia Car Co.

The Chicago, Burlington & Quincy has ordered repairs to 100 gondolas from the Keith Railway Equipment Co.

The New York Central is having 500 coke cars converted to gondola cars at the shops of the Ryan Car Co., Hagewisch, Ill.

500 coke cars converted into gondola cars at the shops of the Buffalo Steel Car Co., Buffalo, and 973 coke cars converted into 500 flat, 300 double deck stock and 173

single deck stock cars at the shops of the American Car & Foundry Co., Detroit, Mich.; for the Pittsburgh & Lake Erie 1200 coke cars are being converted into box cars at the shops of the Standard Steel Car Co., Newcastle, Pa.; 300 coke cars converted into box cars at the shops of the American Car & Foundry Co., Detroit.

The Rock Island has placed 1500 national dump car repairs with the Western Steel Car & Foundry Co.

The Chicago Elevated Railway has ordered 100 elevated cars from the Cincinnati Car Co.

The A. B. C. Transit Refrigerator Co., Chicago, has renewed its inquiry for 150, 40-ton express refrigerator cars.

The National Railways of Mexico have ordered 5 first-class and 10 second-class, narrow gage passenger coaches from the Pullman Co.

The Boston Elevated has ordered 40 tunnel cars from the Pullman Co.

The Baldwin Locomotive Works has received an order for 25 consolidation type locomotives from Poland. This type is a duplicate of 150 engines purchased from Baldwin about three years ago. President Vaclain stated this order will amount to about \$1,000,000.

Evidence of the amazing growth of the electrical industry is afforded by the fact, shown in census reports on manufactures, that in 1919 there were 212,374 wage earners engaged in the manufacture of electrical machinery, apparatus and supplies, as compared with only 1271 in 1879. Salaries and wages increased during that period from \$683,164 to \$336,369,291.

The structural steel work on the new wire and rod mill of the Whitaker-Glessner plant of the Wheeling Steel Corporation at Portsmouth, Ohio, has been completed, and the brick walls are now going up. It is expected that installation of machinery will commence in about three weeks, and that operations will begin in the new mills about Jan. 1.

A booklet entitled, "250 Lacquer Questions Answered" has been issued by the Zeller Lacquer Mfg. Co., 342 Madison Avenue, New York, for distribution to those who request it. The attempt in compiling the questions and answers is to cover every problem confronting the lacquer user.

Iron and Steel Markets

MORE PLANTS SHUT DOWN

Fuel Situation More Critical in All Districts

Constriction of Steel Production Will Increase Even with Strike Settlement

The fuel stringency has become much more pronounced at iron and steel works. In the Chicago, Cleveland, Youngstown, Pittsburgh and Buffalo districts a dozen more blast furnaces have been forced to suspend. As many more are likely to be thrown idle by another week, and indications are that in two weeks several steel plants will be forced to stop.

The whole industry is in uncertainty over the working out of priorities, since the practical application of the plan has not been made known, but it is plainly indicated that for a good many weeks but a small percentage of newly mined coal will go into the production of iron and steel.

Whatever agreement may be reached at the Cleveland coal conference, Pittsburgh district mines on which the Central Western producers of steel draw so heavily will be but little affected, and Pittsburgh sentiment as to iron and steel output in the next two months is far from hopeful.

Chicago steel companies have led for many weeks in percentage of active capacity, but the operating situation there is now approaching a crisis. Shortage of open-top cars and congestion and embargoes on the railroads have been serious complications. Yet for a leading Chicago mill the week has been one of the largest of the year in new orders booked.

There is no excitement among consumers, and little of the scramble for material that is often seen in time of scarcity. Railroads, car builders and automobile works have been the most active buyers, much of the business being placed despite the fact that definite delivery cannot be promised.

Coming eastward from Chicago less pressure upon the mills appears, and in eastern Pennsylvania new inquiry is small, consumers being not disposed to pay present high prices when there is no assurance of coal with which to operate. More is heard of curtailed output by steel users because of shortage of various other raw materials and in some cases labor scarcity.

In the Pittsburgh district the Carnegie Steel Co. has been meeting the situation by concentrating in its Monongahela River plants and slowing down at outlying plants which it is more difficult to supply with fuel. The closing of the Farrell, Pa., steel works means a reduction in the allotment of sheet bars to nearby mills of the American Sheet & Tin Plate Co.

Some steel companies are increasing their scrap charge in making steel, while using up pig iron in stock and doing more melting with natural gas and fuel oil.

July output of steel ingots showed an expected decrease from June, but it was not large. The estimated daily rate for the country was 113,700 tons, as compared with 115,800 tons in June and 114,700 tons in May. The July rate represented about 35,-

350,000 tons per year; that of June about 36,000,000 tons. August will show a pronounced falling off.

With rising prices for coke and pig iron, finished steel, where bought for early delivery, is from \$2 to \$3 per ton higher. No formal advances have been made by the Steel Corporation, but on plates, shapes and bars a quotation below 1.80c., Pittsburgh, is rare. Independent makers have been freely quoting 2c. and from that to 2.15c.

The market is being largely made by the smaller consumers who have been able, in many cases, to struggle along with better success than some larger ones.

The common belief that an early ending of both coal and railroad strikes would not avert the more serious shutdowns the steel trade sees ahead has been laid formally before the Commerce Commission. The Associated General Contractors of America protest that unless the priorities plan is modified, much construction work will be stopped. It is pointed out that with 291,000 cars per week taken for coal movement only 33,000 open top cars weekly would be available for all other purposes.

That contract buying has not been halted by high prices appears from further new car and car repair orders. Locomotives bought in July numbered 353, the largest month in the year. At Cleveland 10,000 tons of plates and shapes were placed with the Carnegie Steel Co. for two new Detroit and Cleveland passenger boats and 4,600 tons for a new ore freighter. Standard Oil Co. tank plates amount to 15,000 tons.

Rail mills are having little to do, but the Southern Pacific has placed about 47,000 tons for 1923 with the Alabama mill.

More blast furnaces have had to withdraw from the pig iron market and again advances have been made of \$1 and \$2 per ton. Most foundries have iron on hand or on contract, and the present buying is to provide against a more acute scarcity expected in the fall. Blast furnaces are counting on high fuel costs, even though not at the present extreme, throughout the year.

Pittsburgh

Trend of Plant Activity Still Downward— Prices Mount on Small Purchases

PITTSBURGH, Aug. 8.—Iron and steel plant activities in this and adjacent territory slowly but steadily are tapering off as a result of the increasing shortage of fuel. There has been a further net loss of three furnaces. The Dover furnace of Hanna Furnace Co., Dover, Ohio, was banked yesterday, while Youngstown Sheet & Tube Co. and the Cambria Steel Co. each has retired one furnace. The Carnegie Steel Co., in closing down its Farrell, Pa., steel works last Saturday, also banked two of the three blast furnaces at the plant, but this curtailment has been offset by turning on the blast once more in two of the Carrie furnaces which were banked late last week. Several other furnaces are on the ragged edge and another week probably will tell the story of additions to the idle list.

Outside of the Youngstown district, which is suffering most from the fuel shortage, there has not been

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 8 1922	Aug. 1 1922	July 11 1922	Aug. 9 1921
No. 2X, Philadelphia....	\$31.14	\$29.76	\$27.64	\$19.84
No. 2, Valley furnace....	29.00	28.00	24.00	19.50
No. 2, Southern, Cin'ti....	24.05	22.55	21.53	23.50
No. 2, Birmingham, Ala....	19.50	18.50	18.00	19.00
No. 2 foundry, Chicago*	27.00	26.00	24.00	18.25
Basic def'd, eastern Pa....	27.25	27.25	25.75	20.26
Basic, Valley furnace....	26.00	25.00	24.00	18.00
Valley Bess. del. Pitts....	28.76	26.76	26.77	21.96
Malleable, Chicago*	27.00	26.00	24.00	18.50
Malleable, Valley.....	28.00	27.00	24.50	20.00
Gray forge, Pittsburgh....	28.76	27.76	25.27	21.46
S. charcoal, Chicago....	33.15	33.15	31.65	33.50
Ferromanganese, seaboard	67.50	67.50	67.50	70.00

Rails, Billets, Etc., Per Gross Ton:	Aug. 8 1922	Aug. 1 1922	July 11 1922	Aug. 9 1921
O-h. rails, heavy, at mill....	\$40.00	\$40.00	\$40.00	\$47.00
Bess. billets, Pittsburgh....	35.00	35.00	35.00	30.00
O-h. billets, Pittsburgh....	35.00	35.00	35.00	30.00
O-h. sheet bars, P'gh....	35.00	35.00	35.00	32.00
Forging billets, base, P'gh	40.00	40.00	40.00	35.00
O-h. billets, Phila.....	42.67	40.17	40.17	35.74
Wire rods, Pittsburgh....	40.00	40.00	40.00	42.00
Skelp. gr. steel, P'gh. lb....	1.80	1.70	1.70	1.75
Light rails at mill.....	1.75	1.75	1.75	1.85

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia....	2.025	2.025	1.925	2.05
Iron bars, Chicago.....	2.00	2.00	1.80	1.75
Steel bars, Pittsburgh....	1.80	1.70	1.70	1.75
Steel bars, Chicago.....	1.90	1.75	1.75	2.13
Steel bars, New York....	2.14	2.04	2.04	2.13
Tank plates, Pittsburgh....	1.80	1.70	1.70	1.80
Tank plates, Chicago.....	1.90	1.75	1.75	2.18
Tank plates, New York....	2.14	2.04	2.04	2.18
Beams, Pittsburgh.....	1.80	1.70	1.70	1.85
Beams, Chicago.....	1.90	1.75	1.75	2.23
Beams, New York.....	2.14	2.04	2.04	2.23
Steel hoops, Pittsburgh....	2.50	2.50	2.50	2.25

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Aug. 8 1922	Aug. 1 1922	July 11 1922	Aug. 9 1921
Sheets, black, No. 28, P'gh	3.15	3.15	3.15	3.00
Sheets, galv., No. 28, P'gh	4.15	4.15	4.15	4.00
Sheets, blue an'l'd, 9 & 10	2.40	2.40	2.40	2.40
Wire nails, Pittsburgh....	2.40	2.40	2.40	2.75
Plain wire, Pittsburgh....	2.25	2.25	2.25	2.50
Barbed wire, galv., P'gh...	3.05	3.05	3.05	3.40
Tin plate, 100-lb. box, P'gh	\$4.75	\$4.75	\$4.75	\$5.25

Old Material, Per Gross Ton:

Carwheels, Chicago.....	\$19.50	\$19.50	\$19.50	\$12.50
Carwheels, Philadelphia...	17.50	17.50	17.50	16.00
Heavy steel scrap, P'gh...	17.50	17.00	17.50	12.50
Heavy steel scrap, Phila...	15.00	15.00	15.00	11.50
Heavy steel scrap, Ch'go...	15.50	15.50	15.50	10.25
No. 1 cast, Pittsburgh....	19.00	19.00	19.00	16.00
No. 1 cast, Philadelphia...	18.00	18.00	17.50	17.00
No. 1 cast, Ch'go (net ton)	18.00	17.00	17.00	11.50
No. 1 RR. wrot, Phila....	17.50	17.50	17.00	14.00
No. 1 RR. wrot, Ch'go (net)	14.25	14.25	13.50	9.75

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt....	\$14.00	\$14.00	\$9.50	\$2.75
Foundry coke, prompt....	15.00	14.50	10.00	3.75

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York....	14.12½	14.12½	14.00	12.00
Electrolytic copper, refinery	13.75	13.75	13.75	11.75
Zinc, St. Louis.....	6.30	6.25	5.52½	4.20
Zinc, New York.....	6.65	6.60	5.87½	4.70
Lead, St. Louis.....	5.50	5.47½	5.50	4.20
Lead, New York.....	5.85	5.80	5.75	4.40
Tin (Straits), New York....	32.62½	32.75	31.12½	27.75
Antimony (Asiatic), N. Y.	5.25	5.25	5.00	4.60

Composite Price, Aug. 8, 1922, Finished Steel, 2.212c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	Aug. 1, 1922, 2.169c. July 11, 1922, 2.169c. Aug. 9, 1921, 2.364c. 10-year pre-war average, 1.689c.
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Composite Price, Aug. 8, 1922, Pig Iron, \$25.94 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	Aug. 1, 1922, \$24.38 July 11, 1922, 23.61 Aug. 9, 1921, 18.52 10-year pre-war average, 15.72
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very much decline in steel works operations. This may be explained by the fact that most companies have some stocks of iron to draw upon and are increasing the scrap content of the charge and using fuel oil and natural gas as the melting agent. The Carnegie Steel Co. is meeting the situation by concentrating in its Monongahela river plants and slowing down at its outlying plants which are more difficult to provide with fuel than those in the former districts. An early possibility is the banking of two Mingo, Ohio, furnaces and the starting up of two Clairton stacks. Such a course is not open to other companies and as supplies of raw materials become exhausted, suspensions will follow.

Early termination of the rail and coal strikes, it is believed, would have little effect in staying the downward trend of plant activities, because of the low place occupied by the steel industry in the priority schedule. Although the supply situation is growing steadily tighter in steel and promises to be much worse before it is better, it is commented upon that there is so little excitement among consumers and that pressure for shipments is much less urgent than in other periods of shortage. Users of plates are urging shipments of

material due them on orders, but in all other cases, with the possible exception of pipe, buyers appear to be satisfied to bear their part in a condition for which the steel manufacturers are in no wise responsible.

The market is being made these days by the smaller consumers who thus far have been able to struggle along with greater success than the larger consumers. This also is the case with pig iron, demand for which is for small tonnages for small users. Prices are reflecting such buying, further advances of \$1 to \$2 a ton having been established in pig iron, while on the major steel products 1.70c. is fast disappearing, except for very indefinite delivery, and the more common minimum now is 1.80c. Cold finished steel bars have advanced \$3 a ton and higher prices also have been established on track supplies. Desirable scrap is hard to obtain except at stiff prices and fuel remains costly since the machinery for enforcing the priority system has not yet been set up.

Pig Iron.—Business of the past week has been of very small proportions, but the growing scarcity of available supplies as well as high costs find full reflection in prices. There no longer seems to be any found-

dry iron at less than \$29, Valley furnace, for No. 2, and small sales of this grade have been made from a western Pennsylvania furnace as high as \$30. Prices of such lots of low silicon foundry iron as are left naturally are enhanced in value by the advance in the base grade. Although sales of the steel-making grades are very limited and usually of tonnages not regarded as quotation making lots, prices are up \$1 to \$2 in recognition of the fact that merchant producers have little iron and the steel companies are melting instead of offering for sale stocks they have on their yards. Quotations to a large degree now are an appraisal of to-day's possibilities, since their basis in sales is a small one.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.76 per gross ton:

Basic	\$26.00
Bessemer	27.00
Gray forge	27.00
No. 2 foundry	29.00
No. 3 foundry	27.00
Malleable	28.00

Ferroalloys.—There is no special change in general conditions. Such business as is doing in ferromanganese is in small lots, usually of less than carloads, on which as high as \$85 per ton, Atlantic seaboard, is said to have been obtained. On large lots, the quotable prices are unchanged, with British material still offered, subject to cabled confirmation, for September delivery, at \$67.50. Eastern seaboard. On spot tonnages as high as \$75 is quoted, but the most recent business was at \$70 and on sales the market is not over \$72.50. Spiegeleisen is almost impossible to obtain for early delivery. Domestic producers are sold up over the remainder of the year and while some British material is reported to be lying in New York, it is held above the prices that consumers feel they can afford to pay. Little interest is displayed in ferrosilicon or silvery iron.

We quote 78 to 82 per cent ferromanganese, \$67.50 c.i.f. Atlantic seaboard for domestic; British, spot, \$72.50; British, future, \$67.50; German, 76 to 80 per cent, \$66. Average 20 per cent spiegeleisen, \$36 furnace; 16 to 19 per cent, \$35 furnace; 50 per cent ferrosilicon, domestic, \$55 to \$60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, \$41.50; 11 per cent, \$44.80; 12 per cent, \$48.10; 13 per cent, \$52.10; 14 per cent, \$55.10; silvery iron, 6 per cent, \$30; 7 per cent, \$31; 8 per cent, \$32.50; 9 per cent, \$34.50; 10 per cent, \$36.50; 11 per cent, \$39; 12 per cent, \$40.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is \$4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Although steel works operations in this district are not suffering as much from the fuel shortage as are the blast furnaces, there has been some contraction and available supplies of billets, sheet bars and slabs are very limited. Open hearth operations are sustained fairly well by the use of fuel oil and natural gas and the raising of the scrap content in the charge, but this practice adds to costs, particularly, since a number of steel companies lately have been finding it hard to obtain satisfactory scrap except at high prices. It is reported that on small tonnages of forging billets, which were urgently needed, as high as \$45, has been obtained and \$40 is said to have been quoted against a recent sheet bar inquiry. We continue to regard \$35 as a fair appraisal of the present market on sheet bars, slabs and large soft billets, but there is little question that this price would be exceeded if consumers had to have supplies in a hurry. Very few really urgent demands are current.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at \$35; 2 x 2-in. billets, \$35; Bessemer and open-hearth sheet bars, \$35; slabs, \$35; forging billets, ordinary carbons, \$40, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—The market is nearer \$43, base, than it is \$40, although the leading interest as yet has made no announcement of an abandonment of the latter price. Independent makers are reluctant about taking on additional business in view of the uncertainty as to continued operations, on account of the coal situation, but regard \$43 as the market if they do take on any orders. There is one inquiry for 2000 tons before the market and no scramble among producers to get it.

We quote No. 5 common basic or Bessemer rods to domestic consumers, \$40 to \$43; chain rods, \$40 to \$43; screw stock rods, \$45 to \$48; rivet and bolt rods and other rods of that character, \$40 to \$43; high carbon rods, \$47 to \$53, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Iron and Steel Bars.—The market on steel bars is moving away from its recent minimum of 1.70c., base, Pittsburgh, and while some business might be taken by one or two makers from regular customers for indefinite delivery at that price, the more common minimum for relatively early shipments is 1.80c., and 2c. and even more is being asked by those in position to make prompt shipments. Leading mills have pretty heavy obligations and only one or two seem willing to take on fresh business. New demands in reinforcing bars are lighter than they have been, but early shipments are as hard to obtain as in ordinary steel bars. Rail steel bars are firmer in sympathy with those rolled from billets and also because of the higher market in rails for rerolling.

We quote steel bars rolled from billets at 1.70c. to 1.90c.; reinforcing bars, rolled from billets, 1.70c. to 1.90c. base; rail steel reinforcing bars, 1.70c. to 1.75c.; refined iron bars, 2.25c. in car loads, f.o.b. mill, Pittsburgh.

Structural Material.—The price situation is getting stiffer as a result of the hindrances to production created by the coal and rail strikes. Mill obligations exceed probable production over the next few months and manufacturers who have not withdrawn from the market are picking their new orders. Where early delivery is essential buyers are having difficulty in interesting the mills at a price of less than 1.80c., Pittsburgh. Fabricating interests report a good inquiry, but the uncertainty as to deliveries is holding up awards. Plain material prices are given on page 383.

Plates.—Makers are heavily committed and a number of them, on account of the uncertain operating outlook, cannot consider new business even at premium prices. On small tonnages 2c., base, Pittsburgh, is not out of the question and on large lots only preferential customers are able to interest the mills in tonnages at less than 1.80c. That there should be a shortage of plates in view of the expansion of capacity during the war is surprising, but probably finds its explanation in the fact that a considerable percentage of capacity could not be operated profitably at the prices that prevailed early in the year, and such capacity cannot now go on with the production of steel on the downgrade. Prices are given on page 383.

Steel Skelp.—The shortage of supplies, especially of grooved, is as acute as ever and the tendency of prices is upward. Operation of butt weld pipe furnaces is restricted because of the scarcity of grooved skelp, which is explained largely by the curtailment of Bessemer plant operations. While 1.70c. still can be done on sheared skelp, this price is disappearing and the market is moving strongly toward a minimum of 1.80c. As much as 2c. is being paid for narrow grooved skelp.

Wire Products.—It is fortunate that demands upon producers are not heavy, for all of them have obligations against which they are not making much progress owing to the effect of the coal shortage on steel production. Increasing costs are indicated and there is not anxiety for additional business. One large independent company has practically withdrawn from the market, taking only such orders as it is reasonably certain of being able to fill, while another is taking business only on a day to day basis. All makers are behind in their deliveries on the smaller sizes of nails. Most of the business now on makers' books is at the Steel Corporation prices. Independent companies, however, have never formally abandoned the advances over those prices set up early in April. Quotations are on page 383.

Steel Rails.—Makers of light rails are showing increased indifference to new demands. One of the independent producers is refusing all business except that which can be supplied from stock, while the Carnegie Steel Co. has orders sufficient to engage rolling capacity for the next three or four weeks. The mill base still is 1.75c. for those rolled from new billets, but stock shipments are priced as high as 2c., base. Light rails rolled from old standard sections are held a little more firmly.

We quote 25 to 45-lb. sections, rolled from new steel, 1.75c. base; rolled from old rails, 1.65c. to 1.70c. base; standard rails, \$40 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Pipe.—The supply situation in standard pipe has become so acute that makers now actually welcome cancellations. The shortage of coal threatens to bring a considerable curtailment of production soon and actually has affected manufacturers in the outlying districts. Bessemer departments of both of the Youngstown manufacturers now are idle and this affects production of the butt weld sizes, for which the demand is strongest. All makers, including the National Tube Co., which thus far has not suffered very much loss of output, now are taking on new business in standard pipe with considerable conservatism. Lap welded pipe is more readily available because of the relatively high operation of open hearth furnaces, and the fact that there is some open hearth steel for pipe. An inquiry for 100 miles of 10-in. 35-lb. to 40-lb. line pipe is reported, but the identity of the prospective buyer is not disclosed. Makers of wrought iron pipe are having difficulty in catching up with their obligations in standard pipe. Discounts are given on page 383.

Sheets.—The coal shortage has cut more heavily into operations of Steel Corporation mills than those of the independents. Closing down of the Farrell, Pa., steel works of the Carnegie Steel Co. means a reduction in the allotment of sheet bars to nearby mills of the American Sheet & Tin Plate Co. and a further reduction in steel supplies or an increase in the delivered price is probable from the plan of the Carnegie Steel Co. to concentrate steel works activities in its Monongahela river plants. About 60 per cent of the American Sheet & Tin Plate Co. mills are engaged this week. Some of its plants, fairly well fixed with regard to coal supplies, have no steel, while others having steel, lack coal. Moving the coal to plants having the steel is not attempted because of the danger that it would be seized for preferential consumers or confiscated by the railroads. Slowing down of independent steel works is likely to tell soon on independent sheet mill activities now averaging about 80 per cent. In spite of the prospect of a further backing up in deliveries on contracts, the market is not excited, as buyers seem to regard the situation as one which cannot be helped. With the exception of the agricultural implement manufacturers, no class of sheet consumers has a good claim for preferential treatment in car priorities, which now are getting consideration in view of orders that all cars suitable for the purpose be kept available for moving coal. With the possible exception of automobile sheets, delivery premiums are being paid on only a small part of the current shipments. We make no change in prices, the full range of which are given on page 383.

Tin Plate.—Active independent capacity still exceeds that of the leading interest, the independent mills in this and nearby districts being quite fully engaged as against slightly less than 60 per cent of the Steel Corporation units. This alignment reflects a divergence in steel supplies rather than in orders. A movement by perishable food container manufacturers to secure preferential treatment on car supplies for tin plate shipments does not find much support among manufacturers, who believe that the pack now will suffer little for want of cans. Shortage of steel probably will force a curtailment of production only a little earlier than usual. It is probable that most manufacturers will be able to complete most of their third quarter obligations, and few had any beyond Oct. 1. Prices are unchanged except that owing to the tight steel situation there is less shading of the regular quotation, except to those who usually have preferential treatment.

Boiler Tubes.—Not much activity is observed in charcoal iron tubes, but steel tubes are wanted, the demand being especially brisk for seamless tubes in connection with the heavy orders for new locomotives and for locomotive repairs. Suggestions of higher prices for lap weld tubes are frequent, because it is claimed that costs have risen to a point where present prices are without profit. Discounts are given on page 383.

Cold Finished Steel Bars and Shafting.—There has been a general advance of \$2 per ton since a week ago,

makers of cold drawn, rolled and turned material now quoting a base of 2.25c. base Pittsburgh, for carloads, and 2.50c. for less than carloads, while ground shafting now is priced at 2.65c. base, f. o. b. mill, for carloads and 2.90c. for less than carloads. This development finds its principal explanation in the scarcity and strength of hot-rolled bars.

Hot-rolled Flats.—There is no change in prices, all makers quoting 2.50c. base on orders from regular customers for the ordinary run of sizes and gages, but demanding a premium of \$5 per ton for the light, narrow material or for early delivery of the easily rolled sizes. New demands for cotton ties are almost entirely absent as the business of the season has been closed and the ties rolled. It is, therefore, only a matter of specifications and deliveries during the remainder of the season. Prices on hot-rolled flats are given on page 383.

Cold-rolled Strips.—There is no change in prices. Where buyers insist on specified deliveries most makers are asking 4.25c. base, Pittsburgh, but regular customers of the various makers still are able to find accommodation if willing to accept delivery at makers' convenience at 4c. Most of the current shipments carry a price of less than 4c.

Nuts and Bolts.—Although buyers quite generally entered orders for their third quarter requirements prior to July 1, it is evident that on account of the steel scarcity they are not getting full shipments of contract specifications, since in the past week or two, new demands have been fairly numerous and rather insistent. Discounts printed on page 383 are closely observed on new orders.

Rivets.—Buyers are specifying freely on contracts and much new business is coming out despite the advance of \$5 per ton in prices two weeks ago. Leading makers deplore a runaway market, but fear that still higher prices may result from the scarcity and high cost of bars and rods. Discounts are given on page 383.

Track Supplies.—Advances of \$2 to \$3 per ton lately have been announced by several makers of spikes. Local makers now are quoting large spikes at \$2.35 base per 100-lb. and small spikes and bolt and barge spikes at \$2.75 base per 100-lb. A leading Eastern maker who recently has been quoting \$2.35 and \$2.75, late last week advanced to \$2.50, and \$3, respectively, for large and small spikes. Track bolts also are firmer, being quoted at \$3.25 to \$3.50 base per 100-lb. for carloads and an attempt lately has been made by some to restore the old differential of 1c. per lb. on less than carload lots. Demand for both spikes and bolts is rather brisk for small lots, but the chief reason for the advance is the increasing strength of the market in steel bars. Prices are given on page 383.

Coke and Coal.—Available supplies of coke do not seem to increase much in spite of the gain in beehive oven production, and while the furnaces are buying very little, there seems to be an outlet in other directions at well sustained prices. It is reported that some furnace coke recently has been offered as low as \$13.50 per net ton at oven, but to-day such fuel is not to be had at less than \$14, and some sales have been made at \$14.50, although for other than blast furnace use. On foundry grade the minimum is \$15 per net ton at oven and from that up in accordance with the buyer's ability to pay. The Pittsburgh Crucible Steel Co. is offering some by-product foundry coke at \$16 per net ton, f.o.b. Midland, Pa. Coal prices remain high because as yet there has not been very full application of the priority system. Sales of nearby coal range anywhere from \$7 per net ton at mines for steam grade up to \$8 for small lots of lump gas coal.

Old Material.—The market is showing a stronger tendency on the better grades of open hearth material, due to the fact that offerings are very limited while melters have found cheap offerings are very unsatisfactory. One independent steel company here is offering \$17.50 for No. 1 heavy melting steel and is not

(Continued on page 382)

Chicago

Further Curtailment—Broad Active Buying —Higher Iron and Steel Prices

CHICAGO, Aug. 8.—Owing to the increasing scarcity of fuel, the operating situation in the Chicago district has reached a crisis and another two weeks may see a number of important iron and steel producers entirely idle. Coal stocks have fallen to a dangerously low point and even those furnaces and mills that have their own mines have no assurance that their output will not be allocated to preferred industries. Under the priorities ruling coal can be bought only by making full payment in advance to the State authorities and then to wait one's turn in the hope that the order will go through after the demands of those in the preferred list have been filled. Shortage of open top equipment, congestion and embargoes on the railroads have all operated to complicate the situation and to make the delivery of coal exceedingly uncertain even after it is en route.

The Illinois Steel Co. has been forced to suspend the operation of two additional blast furnaces, having banked one at South Chicago and having blown one out for relining at Joliet. This makes a total loss of six blast furnaces in two weeks, reducing the number of its active stacks to 14 out of 29. Through the greater use of scrap the company is maintaining a steel output of 78 per cent, which was its rate of operation a week ago. The Inland Steel Co. is still on a 65 per cent basis.

Notwithstanding the gloomy production outlook, demand for steel is holding up remarkably well. For a leading local mill, last week was one of the heaviest in the year in new orders booked and specifications were also above the average. New buying covers practically every finished steel commodity except rails and is heaviest in plates, shapes and bars. Conspicuous among purchasers are the railroad car builders, the railroads and the automobile plants. Agricultural implement makers are also increasingly active in the market and among users of minor importance steel sash manufacturers have been placing large orders. Much of this business is being closed despite the fact that definite delivery cannot be promised by the mills and in fact present shipments are being allocated among customers because of curtailed output. The slowing up of mill deliveries is affecting the operations of users adversely. The output of railroad carbuilders has been curtailed not only on account of a shortage of steel, but slow deliveries of lumber, specialties, coal shortage and in some instances labor scarcity.

Rising costs have again forced an advance in finished steel products and pig iron. Plates, shapes and bars have gone up to a minimum of 1.90c., Chicago, for shipment at mills convenience, while merchant pig iron is now quoted at \$27 to \$28, base furnace. Steel for prompt shipment is difficult to obtain and is commanding increasing premiums.

Pig Iron.—Rising fuel costs have again resulted in an advance of local merchant iron, the new minimum for contract iron being \$27, base furnace, while spot iron is commanding \$28. Future business is comparatively light, but spot iron is active. Both Northern and Southern iron are difficult to obtain for prompt shipment, however, the former because of prior commitments and the latter because of transportation difficulties, which are holding back shipments from the South. Of forward business recently placed a sale of 1000 tons of Northern foundry for September to November delivery stands out prominently. Among the few large inquiries outstanding are 1000 tons of Southern foundry, wanted by an Illinois melter, for fourth quarter, and 500 tons and 200 tons of 8 per cent silvery, respectively, wanted by Wisconsin and Illinois users for the same delivery. A recent sale of copper free low phosphorus iron in this district was closed at \$34, Valley furnace. Small lots of charcoal have been sold at the new base of \$30, furnace. An English inquiry for a

small tonnage of charcoal iron has been received in this market.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago.....	\$33.15
Northern coke, No. 1, sil. 2.25 to 2.75.....	\$28.00 to 29.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25.....	27.00 to 28.00
Northern high phos.....	27.00 to 28.00
Southern No. 2.....	26.00
Malleable, not over 2.25 sil.....	27.00 to 28.00
Basic.....	27.00 to 28.00
Low phos. Valley furnace, sil. 1 to 2 per cent copper free.....	34.00 to 35.00
Silvery, sil. 8 per cent.....	37.29

Ferroalloys.—A local user has purchased a car of spiegeleisen at \$46, delivered, but there is little additional material available at that price and an early advance is looked for. A carload inquiry for ferromanganese is current.

We quote 78 to 82 per cent ferromanganese, future, \$75.06; prompt, \$82.56, delivered; 50 per cent ferrosilicon, \$57, delivered; spiegeleisen, 18 to 22 per cent, \$46, delivered.

Bars.—Demand for soft steel bars is heavier than for any other finished steel product. Buyers, however, are finding it difficult to obtain material, particularly for specific delivery. The minimum local price for indefinite delivery has advanced to 1.90c., Chicago. The Inland Steel Co. has withdrawn all quotations. For reasonably early shipment the going market appears to range from 2.25c., delivered Chicago, upward. Fuel shortage and labor scarcity are a source of great concern to mills rolling bar iron, but it is still possible to place orders for this product at 2c., Chicago. Rail steel bars have advanced to a minimum of 1.80c., f.o.b., or Chicago. A strike of mill operators has forced the two Chicago Heights rail steel bar plants to suspend operations.

Mill prices are: Mild steel bars, 1.90c. to 2c., Chicago, for indefinite delivery; common bar iron, 2c., Chicago; rail steel, 1.80c., mill or Chicago.

Jobbers quote 2.60c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.55c. for rounds and 4.05c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.35c. base; hoops, 3.60c.; bands, 3.35c.

Bolts and Nuts.—Some business is still being placed at the discounts of May 11, but with raw material increasing in price and bolt production endangered by the fuel shortage, the tendency is toward greater firmness at the July 1 price. The automobile plants, which have been heavy buyers of bolts and nuts, are in danger of early shutdowns owing to lack of coal. The Ford Motor Co. has only two weeks' supply of fuel on hand. Discounts on page 383 apply in this territory, except that they are f.o.b., Chicago, instead of f.o.b., Pittsburgh.

Jobbers quote structural rivets, 3.25c.; boiler rivets, 3.35c.; machine bolts up to 3/4 x 4 in., 50, 10 and 10 per cent off; larger sizes, 50 and 10 off; carriage bolts up to 3/4 x 6 in., 50 and 5 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, \$3.25 off; blank nuts, \$3.50 off; coach or lag screws, gimlet points, square heads, 60 per cent off; quantity extras are unchanged.

Wire Products.—New business last week showed a big increase over the four weeks previous. Apparently jobbers find that they must again replenish stocks and it is probable also the serious turn of the fuel situation in relation to mill operations accounts for the sudden desire of many buyers to have their orders entered on the books. Orders from the South are conspicuous, reflecting the improved conditions in that section following the marketing of this year's cotton crop at advantageous prices. Business is also good from Northern and Western agricultural sections, except where harvesting has temporarily stopped buying. The demand for nails is very heavy and barbed wire and staples are also much sought after. For mill prices see finished iron and steel, f.o.b., Pittsburgh, page 383.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, \$2.95 per 100 lb.; common wire nails, \$3.10 per 100 lb.; cement coated nails, \$2.60 per keg.

Sheets.—The local source of supply has been largely cut off owing to the fact that the independent producer

has withdrawn from market and the Gary steel mills have been shut down because of shortage of fuel. Demand is still insistent.

Mill quotations are 3.15c. to 3.30c. for No. 28 black, 2.40c. to 2.55c. for No. 10 blue annealed and 4.15c. to 4.30c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote blue annealed, 3.75c.; black, 4.45c.; galvanized, 4.75c.

Plates.—The Standard Oil Co. has placed 33 oil storage tanks of 80,000-bbl. capacity for erection at Casper, Wyo. Of these 25 will be fabricated by the American Bridge Co. and 8 by the Chicago Bridge & Iron Works. The steel, aggregating 10,000 tons, will be rolled by the Illinois Steel Co. There are said to be other sizeable tank inquiries in the market but negotiations are being carried on quietly. Demand for plates is even heavier than in recent weeks, notwithstanding declining mill operations. The leading producer has advanced its price on material for delivery at mills convenience to a minimum of 1.90c., Chicago. The Inland Steel Co. is out of the market. Plates for reasonably early delivery are difficult to obtain even from Eastern mills on a Pittsburgh base.

The mill quotation for indefinite delivery is 1.90c. to 2c., Chicago. Jobbers quote 2.70c. for plates out of stock.

Structural Material.—The future course of construction is dependent on the outcome of the two national strikes. While there is much new work in progress, the increasing difficulty experienced in securing steel and other materials is resulting in the postponement of many projects. Fabricating awards, however, are still on encouraging proportions. Plain material has advanced to a minimum of 1.90c., Chicago, for shipment at mills convenience. The leading independent, however, has withdrawn from the market. Buyers are finding it difficult to obtain material for reasonably prompt delivery from any source, even when they are willing to pay as high as 1.90c. to 2c., f.o.b. Pittsburgh.

The mill quotation on plain material for indefinite delivery is 1.90c. to 2c., Chicago. Jobbers quote 2.70c. for plain material out of warehouse.

Reinforcing Bars.—The realization that steel mill operations are being sharply curtailed on account of the shortage of fuel has resulted in releasing many orders from buyers who have not yet covered their requirements. In many cases these users are asking for considerably more tonnage than they absolutely need, believing, no doubt, that with warehouses giving them only part of what they ask for, they will still receive all the tonnage that they imperatively require. Lettings and inquiries of reinforcing steel are still numerous, although it is realized that if the coal and railroad strikes continue, building operations will be affected adversely. The warehouse price on deformed reinforcing bars is still 2.38c., Chicago, but an early advance is looked for in view of the increasing scarcity of steel. Recent awards include:

Harbor View Apartment, Chicago, 350 tons, to Paul J. Kalman Co.

Bridge, Riverside, Ill., 100 tons, to Paul J. Kalman Co.

Holeproof Hosiery Co., Milwaukee, Wis., 100 tons, to Concrete Steel Co.

Little Sisters of the Poor Asylum, Kansas City, Mo., 200 tons, to Concrete Steel Co.

Edwards Motor Car Co., Milwaukee, 100 tons, to Truscon Steel Co.

Pending business includes:

Memorial building, Purdue University, LaFayette, Ind., 152 tons.

Grain elevator, Kansas City, Mo., 800 tons.

Sovereign Hotel, Chicago, 300 tons.

Louisville Gas & Electric Co., building, Louisville, Ky., 300 tons, to Concrete Steel Co.

H. & M. Body Corporation plant, Racine, Wis., 100 tons, to Corrugated Bar Co.

Atchison, Topeka & Santa Fe, office building, Newton, Kan., 150 tons, to Corrugated Bar Co.

Headquarters and service building, Edwards Motor Car Co., Milwaukee, 100 tons, to Truscon Steel Co.

Cast Iron Pipe.—With their books well filled and shop operations endangered by the fuel shortage, pipe makers are not actively competing for new business. At the same time a seasonal dullness has settled on the market, which ordinarily continues until October. Ogden, Utah, has taken bids on 1200 tons and Detroit is in the market for 200 tons of 6 to 8-in. Walbridge, Ohio, takes bids on 200 tons of 4 to 8-in. on Aug. 9.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$50.20 to \$51.20; 6-in. and above, \$46.20 to \$47.20; class A and gas pipe, \$3 extra.

Coke.—The local producers quote \$12.25, delivered, Chicago switching district, and \$13, delivered, Milwaukee, on foundry coke, but these prices are subject to change without notice and the buyer pays the price ruling at time of delivery. A Southern by-product producer is offering foundry coke at similar prices. Deliveries from the South are somewhat better than a week or two ago. Demand for spot coke is exceedingly active and melters are not so much concerned with prices as with deliveries. Connellsville foundry coke is \$15 to \$17 per net ton at ovens, to which a freight of \$4.16 to Chicago must be added. Little Connellsville product is reaching this district, however. Wise County foundry coke with a similar freight rate is quoted at \$10 to \$11, ovens. A recent sale of 400 tons of spot foundry coke from a Northern by-product plant brought \$19.50 delivered, Milwaukee.

Rails and Track Supplies.—The Southern Pacific has placed 50,000 tons of rails for 1923 delivery with the Tennessee mill. The same road has divided an order for 2500 kegs of spikes between the Gary and the Colorado mills. The Missouri, Kansas & Texas has also placed 2500 kegs of spikes, part of which will be shipped by the Gary mills. Demand for track supplies is generally good, with prices unchanged, except on tie plates which have advanced to a minimum of 2c., f.o.b. mill.

Standard Bessemer and open-hearth rails, \$40; light rails rolled from new steel, 1.75c., f.o.b. makers' mills.

Standard railroad spikes, 2.25c. to 2.35c., Pittsburgh; track bolts with square nuts, 3.25c. to 3.35c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.30c. base and track bolts 4.30c. base.

Old Material.—Malleable and cupola grades are in stronger demand, evidently because of the advance in pig iron, and low-phosphorus scrap is also sought after by users. Dealers are avoiding new sales of steel scrap because the supply which is coming on to the market is insufficient even to enable them to fill old orders. Sellers are in a quandary as to what policy to pursue under conditions. As current offerings by producers of scrap are very light, it is difficult to obtain material to apply on orders for prompt shipment. On the other hand, dealers hesitate to buy long, as a continuation of the coal strike will lead to the complete suspension of operations by many users, and hence cut off the demand. The market is stronger than last week, as evidenced by numerous advances, and the trend of prices is expected to keep upward as long as consumers are running their plants. The United States Ordnance Department took bids here to-day on 1400 tons of breakable cast. Railroad offerings include 1800 tons advertised by the Santa Fe and 1200 tons by the Pere Marquette.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails.....	\$19.00 to \$19.50
Cast iron car wheels.....	19.50 to 20.00
Relaying rails.....	22.50 to 27.50
Rolled or forged steel car wheels.....	19.00 to 19.50
Rails for rerolling.....	16.50 to 17.00
Steel rails, less than 3 ft.....	18.00 to 18.50
Heavy melting steel.....	15.50 to 16.00
Frogs, switches and guards cut apart.....	15.50 to 16.00
Shoveling steel.....	15.25 to 15.75
Drop forge flashings.....	11.50 to 12.00
Hydraulic compressed sheet.....	13.00 to 13.50
Axle turnings.....	13.50 to 14.00

Per Net Ton

Iron angles and splice bars.....	18.50 to 19.00
Steel angle bars.....	15.00 to 15.50
Iron arch bars and transoms.....	19.00 to 19.50
Iron car axles.....	23.00 to 23.50
Steel car axles.....	15.75 to 16.25
No. 1 busheling.....	13.00 to 13.50
No. 2 busheling.....	7.50 to 8.00
Cut forge.....	14.00 to 14.50
Pipes and flues.....	11.00 to 11.50
No. 1 railroad wrought.....	14.25 to 14.75
No. 2 railroad wrought.....	14.00 to 14.50
Steel knuckles and couplers.....	16.50 to 17.00
Coil springs.....	17.00 to 17.50
No. 1 machinery cast.....	18.00 to 18.50
No. 1 railroad cast.....	16.50 to 17.00
Low phos. punchings.....	15.00 to 15.50
Locomotive tires, smooth.....	13.00 to 13.50
Machine shop turnings.....	9.50 to 10.00
Cast borings.....	11.25 to 11.75
Stove plate.....	14.75 to 15.25
Grate bars.....	14.50 to 15.00
Brake shoes.....	15.00 to 15.50
Railroad malleable.....	16.50 to 17.00
Agricultural malleable.....	16.50 to 17.00

New York

Scarcity of Pig Iron Accentuated—Due to Fuel Uncertainty Furnaces Can Offer Little Product

NEW YORK, Aug. 8.—The latest developments in the coal and railroad strikes have made no definite change in iron and steel markets except to accent the scarcity of pig iron. Advices from Buffalo indicate that four blast furnaces have been banked since Aug. 1, leaving only seven out of 22 in operation in that district. More foreign pig iron has been sold, but reports of large contracts in which import firms not in the iron business are said to figure are not substantiated. Foundries in buying foreign iron appear to be dealing with firms having a background of experience in pig iron selling. In finished material firmer prices are reported on sales from local warehouses.

Pig Iron.—Fewer furnaces are offering iron in view of the uncertainty about getting sufficient fuel to make the iron already on their books. A number of foundries have been inquiring, but more with a view to safeguarding themselves for the later fall. Prices are higher both on eastern Pennsylvania and Buffalo irons. A Lehigh Valley seller has advanced its price to \$30 at furnace for No. 2X iron. Another eastern Pennsylvania interest has quoted \$29 on small lots for early delivery. In the Buffalo district \$30 has been named for No. 2X. There is still some Buffalo iron available at lower prices, but all such iron has come from a single seller. Two important foundry interests have bought Scotch iron in the past week, 1000 tons in one case and 650 tons in the other. Some of this iron has sold at \$26, New York, but more is being asked to-day. An air brake company has inquired for 500 to 1000 tons of high silicon iron and another interest which buys through New York has inquired for 200 to 300 tons of No. 2X iron. A Connecticut steel plant has been in the market for 3000 tons of basic for September-October delivery, and a western New York railroad supply plant is in the market for 1000 tons of basic. The General Electric Co., which bought for various plants in July, has asked for 500 tons of high silicon iron for its Lynn plant, deliveries from Sept. 1 to Nov. 15. The possibility of a settlement of the soft coal strike has found no response in the market as yet. Such a settlement might probably mean the end of one class of inquiry that has come up in the past two weeks, but it is yet to be seen to what extent foundrymen's expectations of lower prices will be realized. Furnaces look for high fuel for some months to come.

We quote delivered in the New York district as follows, having added to furnace prices \$2.27 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	\$32.77 to \$33.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	31.77 to 32.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	30.77 to 31.77
Buffalo, sil. 1.75 to 2.25	31.91 to 32.91
No. 2 Virginia, sil. 1.75 to 2.25	31.44 to 32.44

Warehouse Business.—No changes of price on iron and steel items is noted, but sheets, both black and galvanized, are distinctly firmer and there is far less tendency to undercut the established schedule. This is also true of wrought iron and steel pipe discounts, probably better than 90 per cent of the sales in this line being consummated now at the established discounts. The margin between warehouse and mill prices on toe calk steel is considered too narrow and a slight advance may be made before long. In sympathy with the higher quotations of the mills on cold rolled shafting and screw stock, some warehouses are also contemplating an increase of 10c. to 15c. per 100-lb. Brass and copper prices are strong and in several instances have been marked up ½c. to 1c. per lb. A renewed interest is reported from manufacturers of radio equipment, who have been extremely quiet for the past few weeks. We quote prices on page 402.

High Speed Steel.—The market continues quiet. The few inquiries that recently appeared have evidently been abandoned for the present. Prices are still at about 75c. per lb. for 18 per cent tungsten high speed

steel with special brands of some companies ranging up to 95c. per lb.

Ferroalloys.—Demand for ferromanganese continues quiet at unchanged prices. It is reported that offerings of spot alloy have been made at \$85 to \$90, delivered. Imports have been large as a result of the recent contracts and the desire to receive the alloy before any possible duty takes effect, those for June having been 13,525 gross tons. These receipts compare with an average of 10,000 tons per month in the months just preceding the war when British producers supplied about 50 per cent of the American consumption. The spiegeleisen market is quiet with some producers out of the market. Inquiries aggregate about 500 tons. Importations of British alloy are offered but at a price higher than domestic quotations. Quotations for manganese ore are unchanged but importations are heavy, those for June having been 44,329 tons. There is a quiet demand for 50 per cent ferrosilicon with quotations unchanged and the same is true of ferrochrome. Quotations are as follows:

Ferromanganese, domestic, seaboard, per ton	\$67.50 to \$70.00
Ferromanganese, British, seaboard, per ton	\$67.50 to \$70.00
Spiegeleisen, 17 to 19 per cent	\$35.00
Spiegeleisen, 20 per cent	\$36.00
Ferrosilicon, 50 per cent, delivered, per ton	\$52.00 to \$55.00
Ferrosilicon, 10 to 15 per cent, delivered, per gross ton	\$38.00 to \$40.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrocromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovandium, per lb. of contained vanadium	\$3.00 to \$3.50
Ferrocobaltititanium, 15 to 18 per cent, in carloads, per net ton	\$200.00
Ores	
Manganese ore, foreign, per unit, seaboard	26c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	\$3.25 up
Chrome ore, basis 48 per cent Cr ₂ O ₃ , crude, per ton, Atlantic seaboard	\$15 to \$18.50
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₂ , New York	45c. to 50c.

Finished Iron and Steel.—What change has occurred in the past week is increased buying from warehouses to satisfy urgent needs which mills cannot supply. There has also been an increase in bookings at the 2c. Pittsburgh basis, two carloads of plates for example going at this figure and round lots of bars for forging as well as for concrete reinforcing work. Probably 5000 tons of bars, largely for building work, are pending. New buying in the aggregate is of course not large, such has been the check brought upon industry by the strikes. Semi-finished steel is strong, 500 tons of forging quality billets going at \$47, Pittsburgh base. Buying at a basis of 1.70c., Pittsburgh, is without any promise as to delivery, while the 2c. basis is for delivery in a few weeks with 1.90c., obtainable on an attractive offering with shipment in a reasonable time and 1.80c. as a minimum for any purchase for definite delivery. Eastern railroads show no interest as yet in rails for next year, though the need of getting a position on rail mill books is being emphasized to insure receiving the material in time for early track work next year.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, structural shapes and steel plates, 2.04c. for indefinite delivery and 2.14c. to 2.34c. for delivery in a number of weeks; bar iron, 2.04c.

Cast-Iron Pipe.—Prices are firm and deliveries continue extended to from two to three months on the smaller sizes and four to six weeks on the large sizes of pipe. No new municipal tenders are noted. The city of Poughkeepsie will open bids on Aug. 10 on the 2500 tons of 24-in. pipe reported last week. Rigid enforcement of priority orders would undoubtedly result in a serious situation among cast-iron pipe makers. Supplies of pig iron on contract are being received in larger quantities than was expected and this, supplemented by small lots of foreign iron under order by some foundries for early delivery distinctly relieves the pig iron situation for pipe foundries. We quote per net ton, f.o.b., New York, in carload lots, as follows: 6-in. and larger, \$53.50; 4-in. and 5-in., \$58; 3-in., \$63.50, with \$4 additional for Class A and gas pipe.

Old Material.—Although the market is generally rather quiet, buying of small orders is fairly brisk.

Cast iron is more active at present than steel, and the material showing the greatest activity is that which is most easily converted with the least fuel. Prices on heavy melting steel are strong at \$10.50 to \$11 per ton, \$10.80 having been paid for shipment to Monessen. Stove plate is firm and \$11.50 has been paid for Mahwah, N. J. A fair estimate of the market on this material is \$11 to \$11.50, although some dealers claim that even a higher quotation is warranted. Clean cast borings are stronger than either mixed borings and turnings or machine-shop turnings, being quotable at \$9.75 to \$10.75 per ton, while the latter are still fairly firm at \$9.25 to \$10.25. Buying for shipment by barge to Buffalo continues at good prices because of the low rate obtained on all water shipment.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard.....	\$10.50 to \$11.50
Steel rails, short lengths, or equivalent.....	11.25 to 11.75
Rebolling rails.....	11.50 to 12.00
Relaying rails, nominal.....	27.00 to 28.00
Steel car axles.....	17.00 to 18.00
Iron car axles.....	22.00 to 23.00
No. 1 railroad wrought.....	12.50 to 13.00
Wrought iron track.....	11.00 to 11.50
Forge fire.....	8.00 to 8.50
No. 1 yard wrought, long.....	11.00 to 11.50
Cast borings (clean).....	9.75 to 10.75
Machine-shop turnings.....	9.25 to 10.25
Mixed borings and turnings.....	9.25 to 10.25
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	9.00 to 9.50
Stove plate.....	11.00 to 11.50
Locomotive grate bars.....	11.50 to 12.00
Malleable cast (railroad).....	10.50 to 11.00
Cast-iron car wheels.....	13.00 to 13.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast.....	\$18.00 to \$19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size.....	16.50 to 17.00
No. 1 heavy cast, not cupola size.....	13.00 to 13.50
No. 2 cast (radiators, cast boilers, etc.).....	12.00 to 12.50

Philadelphia

No Further Curtailment But Prices Higher on Practically No Buying

PHILADELPHIA, Aug. 8.—While the Eastern steel and pig iron trade is not more seriously affected in its operations than a week ago, there is a good deal of apprehensiveness over the coal situation. The industry understands clearly that as soon as the Government priorities are fully working there will be little, if any, coal left for coke ovens and steel plants, and unless the coal or railroad strike, or both, should end within the next fortnight more widespread contraction of operations is inevitable. Even an early ending of the coal strike would not entirely relieve steel plants and blast furnaces for some weeks, as it is apparent that the Government will handle coal distribution until railroads, public utilities and households are provided for.

The volume of inquiry for steel and pig iron is surprisingly small. The explanation for this apparently is that consumers are not disposed to anticipate their requirements for steel and iron at present high prices when they do not know whether they are going to have coal with which to operate.

For the most part, the trade, including both sellers and buyers, are accepting the situation philosophically, and there is less of the hysteria which has marked former periods of shortage. Meanwhile, prices are advancing, and the past week has brought 2c. steel and above \$30 on foundry pig iron.

Pig Iron.—No further curtailment of blast furnace operations has occurred during the past week because of coke shortage, but two of the active furnaces in the East have coke only for about two or three weeks; another has sufficient coke on the ground to last until Sept. 1, while the trade generally is apprehensive that the Government coal priority plan will bring about an almost complete stoppage of pig iron making in this district. The few furnaces that are making foundry iron are not anxious to sell, and there are few inquiries, which indicates that consumers are not anxious to buy at present high prices, especially as they do not know whether they are going to have coal and coke with which to operate. One furnace company is selling No. 2 plain in limited quantities at \$30, furnace, but has no No. 2X

because the poor quality of its coke makes it difficult to make the higher silicon grades. Another furnace is selling No. 2 plain at \$29, furnace, and No. 2X at \$30, furnace, but is confining sales to small lots to help out regular customers. High silicon iron, about 3.50 per cent, has been sold at \$35, furnace. Consumers apparently are relying almost entirely on shipments on their contracts and are filling in chiefly with small quantities of imported iron, which is selling at higher prices than a week ago. Brokers are asking \$26 to \$28, Philadelphia, for English iron; \$27.50 to \$30 for Scotch, while high silicon Scotch, 3.50 to 4 per cent, is offered at \$32 to \$33, Philadelphia. As high as \$27, Philadelphia, has been paid for Continental iron high in phosphorus. A sale of 500 tons of gray forge was made at \$27.50, Eastern furnace, while on a smaller lot divided between two consumers a furnace was paid \$30, furnace, and the latter iron was not strictly true to standard gray forge specifications. The price of copper bearing low phosphorus iron has been advanced by the two principal Eastern makers to \$33, furnace, while standard low phosphorus iron is nominal at \$30, but none is obtainable in this district. The quotations on Virginia iron in the table below merely represent the prices at which last sales were made some time ago, as no Virginia iron is to be had, the furnaces in that State having long since cleaned up the stocks which were left over when they were last in operation.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 76 cents to \$1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$30.14 to 30.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	31.14
East. Pa. No. 1X.....	32.14
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 31.17
Basic delivery eastern Pa.	26.75 to 27.25
Gray forge.....	29.50 to 31.50
Malleable.....	29.00 to 30.00
Standard low phos. (f.o.b. furnace)	Nominal
Copper bearing low phos. (f.o.b. furnace)	33.00

Ferroalloys.—Although the nominal price of English ferromanganese remains at \$67.50 and the domestic at \$70, seaboard, early deliveries cannot be offered, and on sales for prompt shipment \$75 has been obtained, and as high as \$90 has been quoted. About 1000 tons of imported spiegeleisen on dock at Baltimore has been offered at \$40, Baltimore, which is \$4 a ton higher than was recently quoted by a leading Eastern maker whose furnace is now out of blast.

Semi-Finished Steel.—Steel makers are not anxious to sell semi-finished steel, and \$37.50, Pittsburgh, for rerolling billets now appears to be the minimum quotation on any business that might be considered, while forging billers are quoted at \$42.50 or higher, sales having been made at \$44, Pittsburgh. Demand is unimportant.

Plates.—While one or two mills are still nominally quoting 1.80c., Pittsburgh, on plates, they are not in a position to accept much business, and are not therefore a real factor in the market. Only two mills are able to promise early deliveries, and are quoting 2c., Pittsburgh. One of these mills is operating on fuel oil and is fairly confident of being able to meet its obligations. The Lukens Steel Co. withdrew from the market after advancing its price from 1.80c. to 2c., Pittsburgh, having taken considerable business last week. The American Locomotive Co. is reported to have placed about 3000 tons with Eastern mills for the New York Central locomotives recently ordered, and the price paid is said to have been 1.80c., Pittsburgh.

Structural Material.—Mills are accepting orders with great caution, if at all, some being entirely out of the market. One Eastern mill has taken all orders recently subject to cancellation by either buyer or seller in the event that coal shortage makes it impossible to operate. The current market for plain material is certainly not under 1.80c., Pittsburgh, when prompt shipment is required, while 1.85c. has been paid in numerous instances.

Bars.—It would be difficult to-day to direct any buyer to a mill that will accept orders for steel bars for early shipment, except, of course, such bars as are rolled from rails or other old steel. The larger makers of soft steel bars are shipping on contracts and declining to take new orders until the coal situation has become

straightened out. In many instances mills are referring their regular customers to jobbers, some of whom have fair stocks on hand. Eastern bar iron makers are quoting 1.70c. to 1.80c. on carloads lots, with the tendency toward the higher figure, and 2c., Pittsburgh, is being charged for less than carloads.

Warehouse Business.—The demand for steel out of stock continues fairly good in view of the tightening mill situation. Prices on sheets have been slightly advanced. We quote for local delivery from Philadelphia warehouses as follows:

Soft steel bars and small shapes, 2.70c.; iron bars (except bands), 2.70c.; round edge iron, 2.90c.; round edge steel, iron finish, $1\frac{1}{2} \times \frac{1}{2}$ in., 2.90c.; round edge steel planished, 3.65c.; tank steel plates, $\frac{1}{4}$ -in. and heavier, 2.80c.; tank steel plates, $\frac{1}{2}$ -in., 3c.; blue annealed steel sheets, No. 10 gage, 3.50c.; black sheets, No. 28 gage, 4.30c.; galvanized sheets, No. 28 gage, 5.40c.; square twisted and deformed steel bars, 2.80c.; structural shapes, 2.80c.; diamond pattern plates, $\frac{1}{4}$ -in., 4.50c.; $\frac{1}{2}$ -in., 4.50c.; spring steel, 3.50c.; round cold-rolled steel, 3.35c.; squares and hexagons, cold-rolled steel, 3.70c.; steel hoops, No. 13 gage and lighter, 3.75c.; steel bands, No. 12 gage to $\frac{1}{2}$ -in., inclusive, 3.35c.; iron bands, 3.90c.; rails, 2.70c.; tool steel, 8c.; Norway iron, 5.50c.

Spikes.—An Eastern manufacturer has advanced the price of railroad spikes, 9-16 in. and larger, to 2.50c., base, Pittsburgh; $\frac{3}{8}$, 7-16 and $\frac{1}{2}$ in. sizes are now 3c., base, while boat spikes are quoted at 3c., Pittsburgh, in small lots and at 2.50c., Pittsburgh, in lots of 25 kegs or more.

Coke.—The scarcity of coke increases, and it is to be had only at extremely high prices, \$14.50, Connellsville, or more. British coke has been offered here at about \$14, Philadelphia. By-product coke is available in small lots at \$16, Eastern ovens.

Old Material.—A Delaware mill has paid as high as \$15.50 for No. 1 heavy melting steel, this being the only activity of importance in steel scrap. Prices hold up very well considering the small demand. Shafting is higher, a sale having been made at \$22, delivered. We quote for delivery at consumers' works in this district as follows:

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel.....	\$15.00 to \$15.50
Scrap rails.....	15.00 to 15.50
Steel rails, rerolling.....	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under	22.00 to 24.00
Cast iron car wheels.....	17.50 to 18.50
No. 1 railroad wrought.....	17.50 to 18.50
No. 1 yard wrought.....	15.00 to 15.50
No. 1 forge fire.....	13.00 to 13.50
Bundled sheets (for steel works)...	13.00 to 13.50
No. 1 busheling.....	12.50 to 13.00
No. 2 busheling.....	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use).....	13.00 to 13.50
Mixed borings and turnings (for blast furnace use).....	13.00 to 13.50
Machine-shop turnings (for steel works use).....	13.00 to 13.50
Machine-shop turnings (for rolling mill use).....	13.50 to 14.00
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mills).....	14.00 to 14.50
Cast borings (for chemical plants)...	17.00 to 17.50
No. 1 cast.....	18.00 to 20.00
Railroad grate bars.....	14.50 to 15.00
Stove plate (for steel plant use)....	15.00 to 15.50
Railroad malleable.....	15.00 to 15.50
Wrought iron and soft steel pipes and tubes (new specifications).....	13.00 to 13.25
Shafting.....	21.00 to 22.00

Cincinnati

CINCINNATI, Aug. 8.

Pig Iron.—Demand for small tonnages for fill-in purposes constituted the only activity in the market in the past week. With shipments held up on account of the railroad situation local melters are running short of iron, and are forced to borrow from one another to keep going. The result of this condition is seen in higher prices for prompt shipment material, the Southern market having advanced at least \$1 in the week, and southern Ohio irons a similar amount. Sales range all the way from carload to 500-ton lots. A central Ohio melter bought 500 tons of Northern iron on a \$26, Ironton, basis, and a West Virginia melter 600 tons at the same price. We note a sale of 300 tons of Southern resale iron to an Indiana melter on an \$18.50, Birmingham, basis, but against this are numerous sales by furnaces ranging from \$20 to \$21. Practically all Southern furnaces are sold up for third

quarter, and are out of the market for the time being. Shipments are being held back by the rail strike, and tonnages shipped around the middle of July have not yet reached their destination. No furnaces have been banked in this district during the week, but considerable difficulty is being experienced in securing enough coke to operate.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base).....	\$24.65
Southern coke, sil. 2.25 to 2.75 (No. 2 soft).....	24.55
Ohio silvery, 8 per cent.....	24.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2).....	24.27
Basic Northern.....	27.27
Malleable.....	28.27

Fluorspar.—There is a fair number of small inquiries, but most steel plants have abandoned the market until the fuel situation improves. Prices are unchanged at \$17.50 for guaranteed material.

Plant Operations.—The coal and rail strikes have not caused much inconvenience to steel mills operating in this district. The Middletown works of the American Rolling Mills Co. are operating at full capacity, and even with the coal shortage, the company does not anticipate a shutdown, as supplies of natural gas and fuel oil are available to keep the plant running in addition to a fair supply of coal now in stock. At Zanesville the company is operating all its mills, and at Ashland, Ky., a 50 per cent operation in its finishing capacity is being maintained, despite delays due to lack of transportation facilities. The Whitaker-Glessner Co. at Portsmouth is operating at its schedule of last week, and while some inconvenience has been experienced at the plants of the Andrews Steel Co. and Newport Rolling Mill Co. at Newport, Ky., it has not been necessary to curtail operations. All the blast furnaces active last week continue in blast, and it now looks as though the worst of the strike period has been left behind, as railroad movements of freight, including coal, are very much improved over a week ago.

Finished Material.—A slackening up in demand was noted in the past week. Whether this is due to the fact that consumers are pretty well supplied, or to the curtailment of manufacturing operations on account of transportation problems, is difficult to ascertain. New business is not in such volume as during the past several weeks, but specifications on contracts continue to come at a good rate. Consumers are sending in orders for their fourth quarter requirements, but books have not been opened by any mills for this delivery, prices are on the upward trend, and for early delivery as high as 2c. has been paid for bars, shapes and plates. The usual range, however, is still from 1.70c. to 1.90c., the former price carrying no definite delivery promises, and the latter from eight to ten weeks. A Youngstown plate mill, which started up last week, is understood to be booking tonnage at 2c. The demand for sheets has shown a considerable falling off, though prices are well maintained, and for early delivery, six to eight weeks, 3.30c. for black, and 4.30c. for galvanized is easily obtained. Slowing up of the automobile trade is noted in a lessened demand for automobile body sheets, although manufacturers of accessories, such as lamps, radiators and fenders are still good buyers. There has been little activity in the structural field, and no awards involving any considerable tonnages of reinforcing bars have been made in this district. It is reported that a Cleveland district mill, which makes a specialty of reinforcing bars, has raised its price to 2.75c., mill, with engineering service included.

Warehouse Business.—Local jobbers report a continuation of the excellent business enjoyed during the past six weeks, and stocks are being rapidly depleted. Prices are very firm, but unchanged.

Jobbers quote: Iron and steel bars, 2.75c. base; hoops, 3.60c.; bands, 3.35c. base; shapes and plates, 2.85c. base; reinforcing bars, 2.82 $\frac{1}{2}$ c. base; cold-rolled rounds, 3.50c. base; flats, squares and hexagons, 4c. base; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.50c.; No. 28 galvanized sheets, 5.50c.; No. 9 annealed wire, \$2.70 per 100 lb.; common wire nails, \$2.85 per keg, base.

Tool Steel.—A material slowing up is evidenced in the demand for high-speed steel, due primarily to conditions arising from the railroad strike. Prices are unchanged at 75c. per lb. base, for 18 per cent tungsten high speed steel.

Coke.—Nothing new has developed. Shipments are coming through slowly, and foundries are running on the ragged edge. Prices are steadily advancing, and Wise County foundry coke is to-day quoted at \$12, an advance of \$2 over last week. Prices from other districts remain about the same.

Old Material.—The scarcity of pig iron has created an interest in cast scrap, and a number of inquiries for machinery cast are before the trade. Some fair sized sales are reported, and as a result this grade has been advanced \$1 a ton. The market is softer, as a whole, owing to the fact the mills are out of the market, and quite a number of "distressed" shipments are being offered to dealers.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton		
Bundled sheets.....	\$8.00 to	\$8.50
Iron rails.....	13.50 to	14.00
Relaying rails, 50 lb. and up.....	26.50 to	27.00
Ends for rerolling.....	13.50 to	14.00
Heavy melting steel.....	13.00 to	13.50
Steel rails for melting.....	13.00 to	13.50
Car wheels.....	14.50 to	15.00
Per Net Ton		
No. 1 railroad wrought.....	11.50 to	12.00
Cast borings.....	9.00 to	9.50
Steel turnings.....	8.00 to	8.50
Railroad cast.....	14.00 to	14.50
No. 1 machinery.....	17.00 to	17.50
Burnt scrap.....	9.50 to	10.00
Iron axles.....	18.00 to	18.50
Locomotive tires (smooth inside).....	11.00 to	11.50
Pipes and flues.....	6.50 to	7.00

St. Louis

St. Louis, Aug. 8.

Pig Iron.—The market has advanced to \$28, Chicago, for Northern iron, for spot delivery, and \$26 for forward delivery, and is strong at that price. Southern iron has also advanced to \$19.50 to \$20, Birmingham, the Sheffield producer which had been quoting \$18.50 having withdrawn from the market. The fact is there is no Southern iron to be had, the railroad strike having made it impossible to make shipments. Some Southern iron loaded on cars in June for St. Louis delivery is still in the South. This has added to an already serious situation, and iron is exceedingly scarce to get. Makers of Northern iron are well booked with orders, and their costs are steadily mounting on account of the advancing market for coke. The Granite City maker is still on a 100 per cent production basis, but is at present without any stocks of high silicon iron, for which there is a pressing demand. On account of the slow movement of freight, buyers are finding that they are obliged to make spot purchases to supply immediate needs. The situation does not permit of promising any relief, men in the trade say, and they look for higher prices to prevail. The principal transactions of the Granite City maker were the sales of 1000 tons of foundry iron to an East Side melter; 1000 tons of foundry iron to a southern Illinois foundry; 300 tons to a local melter; 100 tons to an Indiana concern and 100 tons to a Belleville melter. One Texas concern wants 500 to 1000 tons of foundry iron and another melter from that state is in the market for 300 tons, and there are numerous scattering inquiries for a carload up to 300 tons. Realizing conditions, users are scaling down their inquiries to cover immediate needs. There is an inquiry for 100 tons of spiegeleisen for prompt shipment. During the last two or three weeks there has been a good demand for ferro-manganese, sales amounting to between 400 and 500 tons.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago and \$5.17 from Birmingham and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25 (forward delivery).....	\$28.16
Northern malleable, sil. 1.75 to 2.25 (forward delivery).....	28.16
Basic (third quar.).....	28.16
Southern foundry, all rail, sil. 1.75 to 2.25.....	\$24.67 to 25.17

Finished Iron and Steel.—The coal strike continues to make it increasingly difficult to get material, and mills are disposed to turn down business because of this condition and an already large order file. Recently there has been a much better demand for plates for oil tanks. A Tulsa manufacturer bought 1000 tons of tank plates here during the week, and reported that the

prospects were for a heavy demand for tanks. The Standard Oil Co. of Indiana is in the market for 25 70,000-gal. tanks, involving about 6000 tons. Railroad inquiries are limited to track material. For instance, the Wabash wants 240,000 tie plates, and 200 kegs of standard track bolts. There has been considerable buying of the latter lately. Other material wanted is such as to appeal only to a warehouse. Inquiries for structural steel in the district have amounted to about 400 tons in lots of 100 tons and less, the inquiries being confined to immediate needs. Galvanized sheets are in good demand, one local jobber buying 200 tons.

For stock out of warehouse we quote: Soft steel bars, 2.70c. per lb.; iron bars, 2.70c.; structural shapes, 2.80c.; tank plates, 2.80c.; No. 10 blue annealed sheets, 3.85c.; No. 28 black sheets, cold rolled, one pass, 4.45c.; cold drawn rounds, shafting and screw stock, 3.50c.; structural rivets, \$3.35 per 100 lb.; boiler rivets, \$3.45; tank rivets, 1/4 in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; small, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank \$3.50; and tapped \$3.25 off list.

Coke.—The demand for coke both from industrial and domestic users is tremendous, with the sources of supply becoming fewer. The St. Louis by-product maker has been out of the market for some time, confining its business to the filling of contracts for gas plants, while the Granite City by-product maker has reduced its coke production to the lowest possible degree consistent with supplying municipalities depending upon them for gas. Granite City coke is being sold at \$12 at the ovens, if they are able to ship it, but orders are being taken subject to delays and price prevailing on date of shipment. Railroad conditions hamper the delivery of Alabama coke into St. Louis, and there is no Connellsville coke to be had.

Old Material.—The market for old material is firm, the only change being in steel couplers and knuckles, which are 50 cents a ton higher. Dealers are holding firm, expecting to get better prices. Very little material is coming into this district, as the railroads are too busily engaged in other matters to give the time to gather up scrap. Rolling mill grades are quiet.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton		
Old iron rails.....	\$16.75 to	\$17.25
Rails for rerolling.....	15.75 to	16.25
Steel rails, less than 3 ft.....	16.25 to	16.75
Relaying rails, standard section.....	25.00 to	28.00
Cast iron car wheels.....	18.50 to	19.00
No. 1 heavy railroad melting steel.....	14.75 to	15.25
No. 1 heavy shoveling steel.....	14.00 to	14.50
Ordinary shoveling steel.....	13.75 to	14.25
Frogs, switches and guards, cut apart.....	15.25 to	15.75
Per Net Ton		
Heavy axle and tire turnings.....	9.50 to	10.00
Steel angle bars.....	13.75 to	14.25
Iron car axles.....	23.50 to	24.00
Steel car axles.....	17.00 to	17.50
Wrought iron bars and transoms.....	19.00 to	19.50
No. 1 railroad wrought.....	13.50 to	14.00
No. 2 railroad wrought.....	13.00 to	13.50
Railroad springs.....	16.00 to	16.50
Steel couplers and knuckles.....	17.50 to	18.00
Cast iron borings.....	9.00 to	9.50
No. 1 busheling.....	11.75 to	12.25
No. 1 railroad cast.....	15.50 to	16.00
Stove plate and light cast.....	12.75 to	13.25
Railroad malleable.....	14.00 to	14.50
Pipes and flues.....	8.75 to	9.25
Machine shop turnings.....	9.25 to	9.75

Buffalo

Buffalo, Aug. 8.

Pig Iron.—Only one Buffalo furnace has iron for sale and this only in limited quantities and all of low silicons. This interest has iron on hand but because of obligations it is not desirable to unload it all at this time, although the demand could easily exhaust the supply. The M. A. Hanna Co. has blown out one furnace and has one in blast. With the other interests the problem is one of trying to operate rather than trying to sell. On No. 2 plain \$30 is easily obtainable, and on No. 2X, \$31. A few scattered carloads were sold by a furnace which took the iron from the yard and obtained for it \$30, \$31 and \$32 on these sales. The interest having iron for sale is making all its quotations subject to immediate acceptance. Inquiry generally has been rather light due in measure to the knowledge that Buffalo furnaces are unable to take business. The

majority of merchants feel that the present price base will not be changed for the remainder of the year; that even though the fuel situation were relieved, there would be little change in prices for at least ninety days.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.....	\$32.00
No. 2X foundry, 2.25 to 2.75 sil.....	31.00
No. 2 plain, 1.75 to 2.25 sil.....	30.00
Basic.....	25.00
Malleable.....	28.00
Lake Superior charcoal.....	31.78

Finished Iron and Steel.—Mills are being brought nearer each day toward a complete shutdown and none feels any easier than last week. There is some difference in just how much longer the mills will keep going, because there is no uniformity in the amount of fuel on hand. The branch of a large independent continues to take black sheet and bolt business. Inquiry is good. Sellers are hearing from customers not ordinarily on their regular calling lists. Particularly is this true of buyers seeking bars. There is plenty of small structural business and Buffalo fabricators have taken some desirable tonnages in operations involving more than 100 tons, as shown in another column. Tin plate demand from canners is especially heavy. A local branch of an independent being able to take as much of this business as comes its way. The same interest is able to take orders for cold finished material and finds the demand good. The price is 2.25c., Pittsburgh, on car-load lots with deliveries usually three to four weeks.

Warehouse Business.—The problem is more to get material than it is to sell it. Demand is very good for all material but notwithstanding merchants do not expect any price advance. Considerable inquiry is coming from outside the normal radius covered by local warehouses, indicative of the seriousness of the situation elsewhere.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 2.85c.; plates, 2.85c.; soft steel bars, 2.75c.; hoops, 3.55c.; bands, 3.40c.; blue annealed sheets, No. 10 gage, 3.80c.; galvanized steel sheets, No. 28 gage, 5.60c.; black sheets, No. 28, 4.60c.; cold rolled round shafting, 3.55c.

Old Material.—Dealers appear to feel easier. Confidence has been partly restored by a large railroad equipment manufacturer's coming into the market for heavy melting steel and paying, it is understood, \$17 for a good grade. About 5000 tons has been purchased so far. Other consumers are buying less tonnages of heavy melting steel. Consumers who regularly buy mixed turnings and borings have stopped shipment, because of blast furnace curtailment. No. 1 machinery cast scrap is strong and there is also a lively demand for low phosphorus scrap.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel.....	\$16.75 to \$17.00
Low phos., 0.04 and under.....	18.00 to 19.00
No. 1 railroad wrought.....	16.00 to 16.50
Car wheels.....	17.00 to 18.00
Machine shop turnings.....	10.50 to 11.00
Cast iron borings.....	14.00 to 14.50
Heavy axle turnings.....	14.00 to 14.50
Grate bars.....	14.00 to 14.50
No. 1 busheling.....	15.00 to 15.50
Stove plate.....	15.00 to 15.50
Bundled sheet stampings.....	11.50 to 12.00
No. 1 machinery cast.....	18.50 to 19.50
Hydraulic compressed.....	15.00 to 15.50
Railroad malleable.....	17.00 to 17.50

Birmingham

BIRMINGHAM, Aug. 8.

Pig Iron.—At the close of the first week in August there was only one openly quoted price for Birmingham iron. That was \$20. The largest foundry iron maker and two small makers were out of the market and those in the market made sales at \$20. Largest of these sales at \$20 was for 1000 tons for August and September delivery, part of the tonnage to go to a Southern plant and part to a Northern one of the same interest. One lot of prompt iron of small tonnage was sold for New York delivery at \$20.50. One maker booked numerous small lots at \$20 base during the week. No maker seemed inclined to shade this base. The market attitude was stronger than at any time since the recovery from the depression began to set in. One lot of 300 tons for fourth quarter sold at \$22, which was base of \$20 and 50 cents for each of two

silicon grades above the 1.75 to 2.25 per cent base. From unofficial reports it seemed clear at the end of the month that stocks on yards had not increased over the low level of July 1 with 44,000 tons. It is doubtful if there was change one way or the other. At the close of July and the first week in August production was maintained at the high pace existing on July 1. Two more blast furnaces were in operation this week than during the same week in July. Proximity of raw materials and company ownership of railroad lines and rolling stock have enabled full production. The Tennessee company, in fact, is credited with a record coal production in July, the holiday considered. The Central Coal & Iron Co. is scheduled to resume at the furnace at Holt this week. Supply of raw material is at hand. The furnace has been repaired. Deliveries are another matter. They are very difficult. Some pig iron is being piled this month on account of the car shortage, which is the only trouble in the Birmingham district.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25.....	\$19.50 to \$20.00
Basic.....	18.50 to 19.00
Charcoal, warm blast.....	30.00 to 32.00

Finishing Mills.—There has been no change in the finishing mill situation since July 1. The Tennessee company has steadily maintained this schedule: Double turn at plate, guide and bar mills at Bessemer, double turn at tie-plate and structural mills at Fairfield, double turn at rail and blooming mills at Ensley, 100 per cent capacity in the ingot mill and full turn at the car works. New high coal-producing records were made in July weeks. Nine blast furnaces were in operation this week, compared with seven July 1. The Gulf States Steel Co. and the American Steel and Wire Co. are on full turn in the finishing mills. Connors Steel Co. is on double turn at the Woodlawn mill and experiencing delays in shipment of cotton ties.

Cast Iron Pipe.—The National Cast Iron Pipe Co. has booked 500 tons for St. Paul and the United States Cast Iron Pipe & Foundry Co. booked the 1000 tons of 20-in. pipe let by Dallas. Some belated customers are reported to be paying \$38 and \$39 for pressure pipe, but the leading interest has not advanced beyond \$37. The shops are on full turn and, incident to the car shortage, are piling some pipe. Sanitary shops are also on full turn except where slowing down on account of inability to ship and reluctance to accumulate exist. The base remains at \$60 for standard pipe.

Coal and Coke.—Alabama mines, owing to the influx of cars from Western roads making extra purchases of coal, continue making the best production records in five years. Spot prices have gotten as high as \$5, but \$3 to \$4 is the rule. Coke is very strong and the base is nearer \$6 and \$7 than the recent \$5.50 to \$6.

Old Material.—There has been a lull in the old material market owing to unwillingness of consumers to take on yards any more stock than meets current needs, while the car shortage works against shipments to distant points. Cast scrap is in fair demand on account of the steady local consumption in foundries, none of which have so far been forced to shut down on account of the rail strike. We quote per gross ton f.o.b. Birmingham district yards as follows:

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails.....	\$13.00 to \$15.00
No. 1 steel.....	12.00 to 14.00
No. 1 cast.....	15.00 to 16.00
Car wheels.....	14.00 to 15.00
Tramcar wheels.....	13.00 to 14.00
Stove plate.....	13.00 to 14.00
Cast iron borings.....	6.00 to 7.00
Machine shop turnings.....	4.00 to 5.00

More men are being added to the force at the works of the Ohio Steel Foundry Co. in Springfield and Lima, Ohio, as a result of the orders placed by the Lima Locomotive Works. The heavier castings will be made at the Lima works and the lighter ones at the Springfield works. Agricultural implement manufacturers are now booking fair-sized orders for the fall trade, according to announcements made by the heads of the local companies.

Boston

BOSTON, Aug. 8.

Pig Iron.—The increased demand for third and fourth quarter iron and larger sales of foreign iron are the features of the market. Inquiries aggregate 4000 to 5000 tons, being about equally divided between No. 2X and No. 1X, ranging from 500 tons down to carlots. Practically no Buffalo, Pennsylvania or Virginia iron is available, consequently activity centers in Alabama and foreign iron. A Providence, R. I., foundry has purchased 500 tons, silicon 2.25 to 2.75 per cent, Alabama iron at \$30 base, dock that city, which with loading and other charges brings the delivered price to around \$31. Smaller tonnages have sold at \$30, Providence, dock base. In addition, fourth quarter Alabama iron sold at \$19.50 to \$20, furnace base. Sales of foreign iron in this territory the past week aggregate 5000 to 6000 tons, mostly Scotch, with silicons equal to our No. 2X and No. 1X. No. 3 Scotch iron sold at \$27.50 to \$29, c.i.f. dock Boston, making the average delivered price in Massachusetts \$30 to \$32. English pig irons are offered for third and fourth quarter shipment on the same basis, while French irons are slightly cheaper. The largest individual lot of foreign iron taken the past week was 1500 tons fourth quarter delivery, by a Connecticut melter. The sale of foreign iron in this market is handicapped by a lack of adequate storage facilities.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia and \$9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75.....	\$32.15 to \$34.15
East. Penn., sil. 1.75 to 2.25.....	31.65 to 33.65
Buffalo, sil. 2.25 to 2.75.....	30.41 to 31.41
Buffalo, sil. 1.75 to 2.25.....	29.91 to 30.91
Alabama, sil. 2.25 to 2.75.....	29.60 to 30.10
Alabama, sil. 1.75 to 2.25.....	29.10 to 29.60

Coke.—The coal situation in this territory continues to tighten up. Both the New England Coal & Coke Co. and the Providence Gas Co. are on a \$16.50 delivered basis for by-product foundry contract coke, but will accept no further business this month. One producer quotes \$19.50 delivered for spot fuel, but no sales on that basis are reported. The other producer is reported to have accepted a limited tonnage of spot business at \$16.50 ovens, the delivered price being considerably under \$19.50. Both producers are seriously handicapped by inadequate coal supplies, and are unable to fulfill all requirements promptly. Demand for coke contracted for earlier is heavy, foundries being apprehensive of securing supplies this fall. A Providence, R. I., foundry wants 500 tons, shipments to begin in September. Crushed coke has advanced \$2, to \$14 on cars ovens.

Finished Material.—Approximately 500 tons of structural steel is being refurnished for a seven-story office building for the Clapp Estate, Portland, Me. Other tonnages on the market are small. Moderately large tonnages of steel bars were placed last week at 2c., Pittsburgh base. Plate and structural prices also are firmer, but mills, especially northern, are not accepting much business except when no delivery specifications are in contracts.

Warehouse Business.—The recent advance in iron and steel prices served to stimulate rather than check the movement out of warehouses. Not only is more stock moving, but inquiries are freer and larger in individual cases. Sales of rivets have increased. Warehouse stocks remain unbalanced after months of readjustment, but in general are in fair condition. Brass wire, sheets, rods and tubing have advanced 1/4c. a pound and sheet zinc 1/4c.

Jobbers quote: Soft steel bars, \$2.75 1/4 per 100 lb. base; 1 1/2 in. concrete bars, \$2.90 to \$3.03; structural steel, \$2.75 1/2 to \$2.90 1/2; tire steel, \$4.15 to \$4.50; open-hearth spring steel, \$4.50 to \$6; crucible spring steel, \$11.50; steel bands \$2.90; hoop steel, \$4.40; cold rolled steel, \$3.50 to \$4; refined iron, \$2.75 1/4; best refined iron, \$4.25; Wayne iron, \$5.50; Norway iron, \$6 to \$6.50; plates, \$2.85 1/4 to \$3.04; No. 10 blue annealed sheets, \$3.90 per 100 lb. base; No. 28 black sheets, \$4.90; No. 28 galvanized sheets, \$5.90.

Old Material.—The old material market is quieter, the demand for borings and turnings, which has been

the feature for several weeks having let up somewhat. Some business in strictly No. 1 borings and turnings was closed the past week at \$9.25 shipping point, for a Pennsylvania mill account, and additional tonnages, including one of 200 tons, are pending. A Massachusetts nail manufacturer also has bought borings and turnings on a \$10 delivered base, having a \$1.40 average freight. Cast iron borings remain difficult to obtain. A sale of 100 tons at \$12.35 shipping point is reported, and several offers of \$12.25 are out, which are expected to close shortly. A few cars of horseshoes have been bought locally at \$13.25. Heavy melting steel offers of \$10.50 shipping point for eastern Pennsylvania delivery, and of \$10.75 for Pittsburgh district delivery are out, but little material is available at those prices. Local dealers report heavy rejections of melting steel by Pennsylvania mills.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$19.00 to \$20.00
No. 2 machinery cast.....	17.00 to 18.00
Stove plate.....	15.50 to 16.50
Railroad malleable.....	15.00 to 15.50
Street car wheels.....	18.00 to 19.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$11.00 to \$11.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 yard wrought.....	10.00 to 10.50
Wrought pipe (1 in. in diam., over 2 ft. long).....	8.00 to 8.50
Machine shop turnings.....	9.00 to 9.50
Cast iron borings, rolling mill.....	9.50 to 10.00
Cast iron borings, chemical.....	12.00 to 12.50
Blast furnace borings and turnings.....	9.00 to 9.50
Forged scrap and bundled skeleton.....	8.00 to 8.50
Street car axles and shafting.....	14.50 to 15.00
Rails for rerolling.....	11.00 to 11.50

Cleveland

Production Rate Held with Difficulty—Costs and Prices Mounting

CLEVELAND, Aug. 8.—Further curtailment of blast furnace operations with several stacks having difficulty in keeping in operation, increasing costs in manufacturing iron and steel, and rapid advances in prices of iron and steel products for anything approaching early delivery characterized the market the past week. One independent steel company estimates that its coal is costing it at least \$12 to \$14 per ton for every ton of steel produced. Steel Corporation subsidiaries have not announced any advance in prices on shapes, plates and bars, but it is understood that not less than 1.80c. will be quoted.

On the eve of the reassembling of the meeting of coal operators and miners the prevailing belief is that most of the operators here will concede nearly everything demanded by the miners. The operators are divided concerning the policy to be pursued, and as one prominent man in the iron trade expressed it, it is a case of demoralization against organization, for the miners are standing firmly for their demands. Indications are that the railroads are making progress in improving service and will grant no concessions to the striking shopmen.

Iron Ore.—Cheering news comes from the head of the Lakes to the effect that railroads, particularly the Great Northern, which have been crippled by the shopmen's strike, are now operating much more satisfactorily, some of them at 85 per cent of the usual capacity, and ore is being loaded rapidly at upper Lake docks. At the lower Lake docks, however, although vessels are supposed to be in the first priority class with railroads, coal is being slowly received and some vessels have been tied up on account of inability to obtain fuel.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, \$5.95; Old range non-Bessemer, 51 1/2 per cent iron, \$5.20; Mesabi Bessemer, 55 per cent iron, \$5.70; Mesabi non-Bessemer, 51 1/2 per cent iron, \$5.05.

Pig Iron.—The active stack of the Cleveland Furnace Co. was banked last Friday, and Perry Furnace, Erie, Pa., has been ordered out and will probably be on the idle list Friday or Saturday of this week. Several other blast furnaces are barely able to keep in operation and the fuel situation shows no improvement.

Foundries have been following a hand to mouth policy in buying pig iron and as a result many of them have very little iron on hand. The announcement of the banking of the Cleveland stack has resulted in numerous melters trying to place orders and sales of No. 2 Foundry in limited quantities, have been made at \$30. It is very doubtful whether less than this could be done. Many foundrymen are fairly well stocked with coke and are willing to pay high prices for iron, if necessary. No basic is being offered for sale in this city and very little foundry iron is obtainable.

A Cleveland melter has placed an order for a moderate tonnage of malleable to be shipped from St. Louis at \$32, delivered, Cleveland. The demand for standard low phosphorus is active and prices have been advanced \$2 to \$3, quotations varying somewhat according to the analysis.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations except basic and low phosphorus are delivered Cleveland, being based on a \$3.02 rate from Jackson and a \$6 rate from Birmingham:

Basic, Valley furnace.....	\$26.00
Northern No. 2 fdy., sil. 1.75 to 2.25.....	30.00
Southern fdy., sil. 1.75 to 2.25.....	24.50
Malleable.....	30.00
Ohio silvery, sil. 8 per cent.....	33.52
Standard low phos., Valley furnace.....	\$35.00 to 36.00

Sheets.—The market is strong. Buying by automobile companies is more active. The usual quotation on automobile stock is 4.75c., but some mills are quoting 4.85c.

Warehouse Business.—Warehouses are enjoying good business and prices are unchanged.

Jobbers quote steel bars, 2.56c.; plates and structural shapes, 2.66c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 5c.; No. 10 blue annealed sheets, 3.50c. to 3.61c.; hoops and bands, 3.21c.; cold-rolled rounds, 3.30c.; flats, squares and hexagons, 3.80c.

Semi-Finished Steel.—The nominal price of \$35 is quoted on sheet bars, billets and slabs, but there is none for sale by any Cleveland producer, and, if any should be offered for sale, it would be at not less than \$40.

Bolts, Nuts and Rivets.—Business is very active. Railroads continue to be among the important buyers. The strike of shop men does not seem to have affected the buying at all and so far has caused little trouble of any kind. While there is some delay in the receipt of steel, manufacturers are not suffering and they are able to make fairly satisfactory delivery on their products. Complaint is made that some of the coal being received is extremely poor.

Old Material.—Owing to strike conditions, buyers are placing no orders and there are no transactions between dealers. Prices are to a large extent nominal.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel.....	\$14.75 to \$15.00
Steel rails, under 3 ft.....	15.25 to 15.50
Rails for rolling.....	15.75 to 16.25
Iron rails.....	14.00 to 15.00
Iron car axles.....	18.00 to 19.00
Low phosphorus melting.....	16.00 to 16.25
Cast borings.....	12.00 to 12.25
Machine shop turnings.....	11.50 to 12.00
Mixed borings and short turnings.....	11.75 to 12.00
Compressed steel.....	12.85 to 13.25
Railroad wrought.....	14.00 to 14.50
Railroad malleable.....	15.50 to 16.00
Light bundled sheet stampings.....	10.00 to 10.25
Steel axle turnings.....	13.00 to 13.50
No. 1 cast.....	17.00 to 17.50
No. 1 busheling.....	10.25 to 10.50
Drop forge flashings over 10 in.....	10.25 to 10.50
Drop forge flashings under 10 in.....	10.00 to 10.50
Railroad grate bars.....	13.75 to 14.25
Stove plate.....	13.75 to 14.25
Pipes and flues.....	10.00 to 11.00

Finished Iron and Steel.—Prices of bars and plates are moving upward rapidly. On bars for prompt delivery sales have been made as high as 2.75c. Fully 20,000 tons of forging bars offered mills has been turned down on account of inability to make deliveries. The Carnegie Steel Co. will furnish 10,000 tons of plates and shapes for the two new passenger boats, the largest on the Lakes, to be built by 1924, for the Detroit & Cleveland Navigation Co. by the American Shipbuilding Co., and also 4600 tons for a new freighter for Pickands, Mather & Co. Inquiries for tank plate from the Sharon field amounting to 6300 to 6500 tons have been received. Independent companies in this

district are now quoting 2.25c. on plates and as high as 2.50c. has been paid on small lots for prompt delivery. Quotations on cold-rolled steel bars have been advanced to 2.25c. and a further advance to 2.50c. is predicted. The McClintic-Marshall Co. has booked 500 tons of reinforcing ribs for the Scotia-Schenectady Bridge, Schenectady, N. Y. The order for the steel for the addition to the Lima Locomotive Works, 2000 tons, has not been placed on account of uncertainty as to delivery. October delivery is desired.

Pittsburgh Iron and Steel Market

(Concluded from page 373)

getting many responses. Another steel company in this district, anxious to get some really good steel, bid \$18.50 delivered for some railroad scrap and failed to secure any. Steel offered in the list of the Pennsylvania Railroad, central region, brought \$18.25, Pittsburgh, and the knuckles and couplers for both this division and the Eastern region went to dealers around \$19 per gross ton, delivered Pittsburgh. The steel foundries are paying higher prices for billet and bloom crops and a large user of machine shop turnings lately has re-entered the market and is offering a slight advance over recent prices.

Principal users of compressed sheets in this district lately have been out of the market, and while some of the offerings by local mills and producers have sold as high as \$16.50, delivered, Pittsburgh, \$16 appears to be as high as any consumers now will go.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows per gross ton:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh.....	\$17.50
No. 1 cast, cupola size.....	\$19.00 to 19.50
Rails for rerolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.....	17.50 to 18.00
Compressed sheet steel.....	16.00 to 16.50
Bundled sheets, sides and ends.....	15.00 to 15.50
Railroad knuckles and couplers.....	19.00 to 19.50
Railroad coil and leaf springs.....	19.00 to 19.50
Low phosphorus standard bloom and billet ends.....	21.00 to 22.00
Low phosphorus plates and other grades.....	19.00 to 20.00
Railroad malleable.....	16.50 to 17.00
Iron car axles.....	26.00 to 26.50
Locomotive axles, steel.....	25.00 to 25.50
Steel car axles.....	17.50 to 18.00
Cast iron wheels.....	18.00 to 18.50
Rolled steel wheels.....	19.00 to 19.50
Machine shop turnings.....	14.00 to 14.25
Sheet bar crop ends.....	19.00 to 19.50
Heavy steel axle turnings.....	15.00 to 15.50
Short shoveling turnings.....	15.00 to 15.50
Heavy breakable cast.....	18.00 to 18.50
Stove plate.....	14.50 to 15.00
Cast iron borings.....	15.50 to 16.00
No. 1 railroad wrought.....	15.00 to 15.50

Consolidation of McKune, Danforth and Egler Blow Torch Systems

PITTSBURGH, Aug. 8.—The announcement of the consolidation of all patents and patent applications relating to combustion in regenerative furnaces, known as the McKune, Danforth and Egler systems, is just announced. The Miami Metals Co., Blair Engineering Co. and Arthur G. McKee & Co. have assigned all patents and applications held by them in connection with the blow-torch process to the Union Trust Co., Cleveland, which as trustee for the open-hearth combustion system, is empowered to grant licenses under these patents. This consolidation will assure to the steel industry the best that has been developed under all of these basic patents combined in one design, and will also remove the possibility of any patent interference in the use of these equipments and methods of operation. The Blaw-Knox Co., Pittsburgh, has been appointed agent for the exclusive sale and manufacture of all of the equipment covered by these patents. It has organized a special engineering and service department, composed of experts in open-hearth design and operation, who will devote their time to the development and sale of these devices.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheets, tank quality, base, per lb.....1.70c. to 1.85c.

Structural Material

Beams, channels, etc.....1.70c. to 1.85c.

Iron and Steel Bars

Soft steel bars, base, per lb.....1.70c. to 1.85c.

Refined iron bars, base, per lb.....2.25c.

Hot-Rolled Flats

Hoops, base, per lb.2.50c. to 2.75c.

Bands, base, per lb.2.50c. to 2.75c.

Strips, base, per lb.2.50c. to 2.75c.

Cotton ties, per bundle of 45 lb.....\$1.11

Cold-Finished Steels

Bars and shafting, base, per lb.....2.25c.

Strips, base, per lb.4.00c.

Wire Products

Nails, base, per keg\$2.40

Bright plain wire, base, per 100 lb.2.25

Annealed fence wire, base, per 100 lb.2.25

Galvanized wire, base, per 100 lb.2.75

Galvanized barbed, base, per 100 lb.3.05 to 3.15

Galvanized staples, base, per keg3.05 to 3.15

Painted barbed wire, base, per 100 lb.2.55 to 2.65

Polished staples, base, per keg2.55 to 2.65

Cement coated nails, base, per count keg1.90 to 2.00

Woven fence, carloads.....73 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads, 60, 10 and 10 per cent off list

Machine bolts, small, cut threads.....60 and 10 per cent off list

Machine bolts, larger and longer.....60 and 10 per cent off list

Carriage bolts, 5/8 x 6 in.: Smaller and shorter, rolled threads. 60 and 10 per cent off list

Cut threads.....60 per cent off list

Longer and larger sizes.....60 per cent off list

Lag bolts.....60, 10 and 10 per cent off list

Flow bolts, Nos. 1, 2 and 3 heads.....50 and 10 per cent off list

Other style heads.....20 per cent extra

Machine bolts, c.p.c. and t. nuts, 5/8 x 4 in.: Smaller and shorter.....50 and 10 per cent off list

Larger and longer sizes.....50 and 10 per cent off list

Hot pressed square or hex. blank nuts.....\$4.50 off list

Hot pressed nuts, tapped.....\$4.50 off list

C.p.c. and t. sq. or hex. nuts, blank.....\$4.50 off list

C.p.c. and t. sq. or hex. nuts, tapped.....\$4.50 off list

Semi-finished hex. nuts: 9/16 in. and smaller, U. S. S.....80 and 10 per cent off list

5/8 in. and larger, U. S. S.....75 and 10 and 10 per cent off list

Small sizes, S. A. E.....80, 10 and 10 per cent off list

S. A. E. 5/8 in. and larger.....75 and 10 and 10 per cent off list

Stove bolts in packages.....80 and 5 per cent off list

Stove bolts in bulk.....80, 5 and 2 1/2 per cent off list

Tire bolts.....65 per cent off list

Track bolts in carloads.....3.25c. to 3.50c. base

Track bolts, less than 200 kegs.....4.25c. to 4.50c. base

Cap and Set Screws

Milled square and hex. head cap screws, 75 and 10 per cent off list

Milled set screws.....75 per cent off list

Upset cap screws.....80 per cent off list

Upset set screws.....80 and 5 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....\$2.65

Large boiler rivets, base, per 100 lb.....2.75

Small rivets.....70 to 70 and 5 per cent off list

Track Equipment

Spikes, 3/4 in. and larger, base, per 100 lb.....\$2.35 to \$2.50

Spikes, 1/2 in. and smaller, base, per 100 lb.....2.75 to 3.00

Spikes, boat and barge, base, per 100 lb.....2.75 to 3.00

Track bolts, base, per 100 lb.....3.25 to 3.50

Tie plates, per 100 lb.....2.00 to 2.25

Angle bars, base, per 100 lb.....2.40

Welded Pipe

Butt Weld

Inches	Steel		Galv.	Inches	Iron		Galv.
	Black	Galv.			Black	Galv.	
1/2 to 3/4	54 1/2	28	28	1/2 to 3/4	+ 3 1/2	+ 22 1/2	
3/4 to 1	60	33 1/2	36 1/2	3/4 to 1	36 1/2	18 1/2	
1 to 1 1/4	65	50 1/2	42 1/2	1 to 1 1/4	42 1/2	27 1/2	
1 1/4 to 2	69	56 1/2	44 1/2				
2 to 3	71	58 1/2					

Lap Weld

Inches	Black	Galv.	Inches	Black	Galv.
2	64	51 1/2	2	39 1/2	25 1/2
2 1/2 to 6	68	55 1/2	2 1/2 to 6	42 1/2	29 1/2
7 to 8	65	51 1/2	7 to 12	40 1/2	27 1/2
9 to 12	64	50 1/2			

Butt Weld, extra strong, plain ends

Inches	Black	Galv.	Inches	Black	Galv.
1/2 to 3/4	50 1/2	33	1/2 to 3/4	+ 4 1/2	+ 37 1/2
3/4 to 1	56	38 1/2	3/4 to 1	35 1/2	23 1/2
1 to 1 1/4	62	50 1/2	1 to 1 1/4	42 1/2	28 1/2
1 1/4 to 2	67	55 1/2			
2 to 3	69	57 1/2			
	70	58 1/2			

Lap Weld, extra strong, plain ends

Inches	Black	Galv.	Inches	Black	Galv.
2	62	50 1/2	2	40 1/2	27 1/2
2 1/2 to 4	66	54 1/2	2 1/2 to 4	43 1/2	31 1/2
4 1/2 to 6	65	53 1/2	4 1/2 to 6	42 1/2	30 1/2
7 to 8	61	47 1/2	7 to 8	35 1/2	23 1/2
9 to 12	55	41 1/2	9 to 12	30 1/2	18 1/2

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2 1/2 per cent.

Boiler Tubes

Lap Welded Steel		Charcoal Iron	
Inches	Black	Inches	Black
1 1/2 in.	26 1/2	1 1/2 in.	5
2 to 2 1/2 in.	41	1 1/2 to 1 3/4 in.	15
2 1/2 to 3 in.	52	2 to 2 1/2 in.	25
3 to 3 1/2 in.	57	2 1/2 to 3 in.	30
		3 1/2 to 4 1/2 in.	32

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn or hot-rolled tubes in carload lots, f.o.b. Pittsburgh, follow:

Inches	Black	Inches	Black
1 in.	60	2 1/2 and 2 3/4 in.	43
1 1/2 and 1 3/4 in.	52	3 in.	47
1 3/4 in.	36	3 1/2 to 4 in.	52
2 and 2 1/2 in.	39	4 1/2 in. to 5 in.	44

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Tin Plate

Standard cokes, per base box.....\$4.75

Terne Plate

(Per package, 200-lb.)

Coating	Price	Coating	Price
8-lb. coating	\$9.30	25-lb. coating I. C.	\$14.25
8-lb. coating I. C.	9.60	30-lb. coating I. C.	15.25
15-lb. coating I. C.	11.80	35-lb. coating I. C.	16.25
20-lb. coating I. C.	13.00	40-lb. coating I. C.	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.40c. to 2.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.15c. to 3.40c.

Galvanized

No. 28 (base), per lb.....4.15c. to 4.40c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.15c. to 3.40c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.....\$0.325	Buffalo.....\$0.265	St. Louis.....\$0.43	Pacific Coast.....\$1.50
Philadelphia, export.....0.265	Cleveland.....0.215	Kansas City.....0.735	Pac. Coast, ship plates.....1.20
Baltimore, domestic.....0.315	Cleveland, Youngstown.....0.19	Kansas City (pipe).....0.705	Birmingham.....0.69
Baltimore, export.....0.255	Comb.....0.295	St. Paul.....0.595	Memphis.....0.385
New York, domestic.....0.34	Detroit.....0.295	Omaha.....0.735	Jacksonville, all rail.....0.50
New York, export.....0.285	Cincinnati.....0.295	Omaha (pipe).....0.705	Jacksonville, rail and water.....0.415
Boston, domestic.....0.365	Indianapolis.....0.31	Denver.....1.275	New Orleans.....0.515
Boston, export.....0.285	Chicago.....0.34	Denver (pipe).....1.215	

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha, and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c. rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2 1/2c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

EXPORT SITUATION DULL

Japan Inactive—United States to Supply Rails for Bolivia—Importers of Foreign Iron Active

NEW YORK, Aug. 8.—Export trade shows but slight change for the better. Japan continues dull and inactive with the exception of a few small inquiries. One export house in New York has received an order from the Hanshin Electric Express Railway for five miles of 75-lb. rails. There is an inquiry in the market for 400 tons of reinforcing bars, and one Japanese house is handling a tender calling for 1300 tons of bridge material. Black sheet buying is at a low ebb, and it is believed by some exporters that what few sheets are now being purchased in Japan are being obtained in England. The Chinese market continues dull. The 5000 tons of grooved rails, which was included in the inquiry issued several months ago by the Pekin tramways, has been awarded to a French mill. What few orders are appearing from South America are small.

The rail tonnage which will be purchased by the Ulen Contracting Co., 120 Broadway, New York, which is executing a railroad construction contract in Bolivia with the government, amounts to 5000 tons of 60-lb. rails with accessories (splice bars, bolts, nuts and spikes). The line, which is to be built from Atoche to Villazon, is 204 kilometers in length and the rail tonnage will probably total 12,000 to 13,000 tons. As a result of new financing by the Bolivian Government, an effort is being made to complete the railroad considerably within the five-year limit originally intended and the Ulen Contracting Co. hopes to lay 75 kilometers before the end of this year. An additional contract for a shorter line between Potosi and Sucre, Bolivia, will probably be let within the next month. In obtaining quotations on the present tender for 5000 tons of rails, bids were received from Britain and Continental countries as well as the United States, but in all probability the contract will be awarded to an American mill, for while the European prices were in some instances lower, in one case \$44 per ton, c.i.f. port, deliveries were generally from four to six months or longer; the American bid on the other hand, was for delivery of 2500 tons by Sept. 1 and the remaining 2500 tons by Sept. 15.

Importing of foreign pig iron continues, but imports are largely confined to Scotch iron, 2 to 2.50 per cent sil. and low in phosphorus. One importer of foreign iron and steel reports that he has cabled for prices, delivered, on 5000 tons of Scotch iron for one consumer and another exporter and importer has cabled inquiries to United Kingdom connections in the past ten days for 1000 tons of Scotch iron. The latter has received three orders on this iron for early delivery, each of 100 tons; from foundries in Poughkeepsie, N. Y., Framingham, Mass., and Boston. Foundries are in many cases evidently insuring themselves a supply of pig iron during the present strike situation, by ordering small tonnages of foreign iron, which in a majority of instances is evidently Scotch iron.

Automatic heat treatment of pipe being manufactured by the centrifugal casting method by the United States Cast Iron Pipe & Foundry Co., has been satisfactorily tested out, according to information received from F. J. Ryan, president F. J. Ryan & Co., Philadelphia, who furnished the equipment.

The bran cleaning department building at the Shemango plant of the American Sheet & Tin Plate Co., New Castle, Pa., was destroyed by fire on Aug. 6, with a loss of \$5,000. Firemen checked the fire from spreading to other departments.

Pilling & Co. announce that on Aug. 15 their New York offices for the sale of pig iron, ore, coal and coke will be removed from 2 Rector Street to larger quarters in suite 2252-53 Equitable Building, 120 Broadway.

JULY STEEL OUTPUT

Ingot Production Rate About 35,360,000 Tons Per Year—Daily Output 2100 Tons Less Than in June

According to the steel ingot statistics, as collected by the American Iron and Steel Institute, the 30 companies, which in 1921 made 87.50 per cent of the total, had an output in July of 2,487,104 gross tons. This compares with 2,634,477 tons in June and is a decline of 147,373 tons.

On the assumption that companies reporting are supplying the same percentage of the total as they did last year (though the percentage may be less) the output for the 25 working days of July was about 2,842,400 tons, or approximately 113,700 tons per day. The June production on the same basis was about 3,010,000 tons, or 115,800 tons per day. The July output was at the rate of about 35,360,000 tons per year; in June it was about 36,000,000 tons per year.

The statistics of the American Iron & Steel Institute since January, 1921, follow:

Months	Open-Hearth	Bessemer	All Other	Total
January, 1921 ...	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
Total 6 months.	6,918,884	2,073,973	13,998	9,006,855
July	689,489	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071
September	908,381	265,152	1,207	1,174,740
October	1,269,945	345,837	1,028	1,616,810
November	1,294,371	363,912	1,718	1,660,001
December	1,129,174	296,380	1,539	1,427,093
Total whole yr.	13,125,578	3,679,682	21,686	16,826,946
January, 1922 ...	1,260,809	331,851	822	1,593,482
February	1,395,835	348,571	616	1,745,022
March	1,918,570	451,386	795	2,370,751
April	1,997,465	445,939	1,109	2,444,513
May	2,214,774	494,893	1,474	2,711,141
June	2,143,708	487,851	2,918	2,634,477
Total 6 months.	10,931,161	2,560,491	7,734	13,499,386
July	2,020,572	461,047	2,485	2,487,104

The July daily estimated output of 113,700 tons compares with 70,019 tons per day in January and 114,717 tons per day in May. April ranks next lowest to July at 111,710 tons per day.

Reduction in Alabama Iron Stocks

BIRMINGHAM, Aug. 8.—Yard stocks went down 8000 tons. The stocks on furnace yards in Alabama on Aug. 1 and July 1 were as follows: Foundry, 25,000 and 28,000 tons; machine cast, 1000 and 3000 tons; warrants, 2000 and 2600 tons; basic, 8000 and 10,000 tons; totals, 36,000 and 44,000 tons. Stocks on yards at this time last year were 216,000 tons.

The Cities Service Co. has approved plans involving an expenditure of several millions of dollars on the properties of the Ohio Public Service Co. The plans approved call for the construction of a 60-mile steel tower electric power transmission line from Lorain to Mansfield, and a similar line, 55 miles long, for Warren, Alliance and Canton. The company is also contemplating the installation of a 20,000-kw. turbine at its power plant in Lorain, Ohio, and a 30,000-kw. turbine in the Toledo Edison plant at Toledo.

The Pennsylvania Railroad has announced that its shops at Mt. Vernon, Ohio, will not be opened again and that the work formerly done at Mt. Vernon will be transferred to Columbus. The reason given is that work can be done more economically at Columbus.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

Copper, New York	Lake	Electro-lytic*	Straits Tin New York	Lead		Zinc	
				New York	St. Louis	New York	St. Louis
14.12½	13.75	32.25	5.80	5.50	6.60	6.25	
14.12½	13.75	32.12½	5.80	5.50	6.65	6.30	
14.12½	13.75	32.50	5.85	5.50	6.65	6.30	
14.12½	13.75	...	5.85	5.50	6.65	6.30	
14.12½	13.75	32.50	5.85	5.50	6.65	6.30	
14.12½	13.75	32.62½	5.85	5.50	6.65	6.30	

*Refinery quotation.

New York

NEW YORK, Aug. 8.

The markets are all strong but only moderately active. Domestic buying of copper is fair with prices strong. The tin market is exceedingly quiet but steady. Demand for lead is very heavy and prices are advancing. Sales of zinc continue in moderate volume at slightly higher levels.

Copper.—Domestic buying of electrolytic copper continues in moderate steady volume, but demand is not heavy nor speculative. The minimum price for August-September and 60-day delivery is 14c., delivered, or 13.75c., refinery, with some producers quoting nothing less than ¼c. above these levels. There is still a very good demand from foreign consumers. Lake copper is quoted at 14.12½c., delivered.

Tin.—Light sales of Straits tin in a very quiet market have prevailed during the last week. On Thursday, Aug. 3, a moderate business was done in shipments from the East at around 32.12½c., the total approximating 150 tons. The uncertainty as to the labor situation is keeping large consumers out of the market. Yesterday and to-day have also been very quiet, partly because of the bank holiday in London yesterday. It is estimated that August shipments from the East will total about 7000 tons. Spot Straits to-day is quoted at 32.62½c., New York. Quotations in London to-day are as follows: £161 12s. 6d. for both spot and future standard and £162 7s. 6d. for spot Straits, or about £1 per ton below quotations a week ago, with the market still strong. Arrivals thus far this month here have been 1130 tons, with 5145 tons reported afloat.

Lead.—Large sales for August and 30-day shipment are reported and the market is firm at hardening prices. The quotations of the leading interest are unchanged at 5.55c., St. Louis, or 5.75c., New York, but in the outside market prices are higher at 5.85c., New York. In the West, however, the metal can be bought from independents at 5.50c., St. Louis. A good general inquiry is reported.

Zinc.—The advance in prime Western, which has continued almost daily for several weeks, apparently came to a temporary standstill last week at 6.30c., St. Louis, or 6.65c., New York, where it has remained for several days. Fundamental conditions are unchanged and demand is reported as good from both galvanizers and brass makers. The only alteration of interest is a slight easing in futures, which are now quoted about five points below August and September delivery, or 6.25c., St. Louis, and 6.60c., New York, due possibly to the expectation of an early settlement of the coal strike and a larger production of zinc ore.

Antimony.—Wholesale lots for early delivery are quoted unchanged in a quiet market at 5.25c. per lb., duty paid, New York.

Aluminum.—For virgin metal, 98 to 99 per cent pure, the leading interest continues to quote at 19.10c. per lb. f.o.b. plant, in wholesale lots for early delivery, and imported metal of the same analysis is offered by dealers at 17.75c. to 18c. per lb., New York, duty paid.

Old Metals.—The market is strong and was quite active the past week. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	13.50
Copper, heavy and wire.....	12.75
Copper, light and bottoms.....	11.25
Heavy machine composition.....	10.50
Brass, heavy.....	8.25
Brass, light.....	6.50
No. 1 red brass or composition turnings.....	8.75
No. 1 yellow rod brass turnings.....	7.50
Lead, heavy.....	5.00
Lead, tea.....	4.00
Zinc.....	3.75

Chicago

Aug. 8.—On the whole the market is quiet and marking time pending a settlement of the coal and rail strikes. There is some hand-to-mouth buying of lead, copper and zinc, but users are afraid to purchase futures. Some melters who are short of coal are said to have sold surplus stocks of metals. Lead and zinc have advanced slightly, while the other metals remain unchanged. Among the old metal grades only copper bottoms and zinc have advanced. We quote, in carload lots, lake copper, 14.25c.; tin, 33.50c. to 34c.; lead, 5.60c.; spelter, 6.40c.; antimony, 7c.; in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.25c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 4.50c.; zinc, 3.50c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

St. Louis

AUG. 8.—The lead market is strong and 10 to 15 points higher for the week, while slab zinc is very strong, at an advance of 20 points for the week. We quote carlots: lead 5.50c. to 5.60c.; slab zinc, 6.30c. On old metals we quote: light brass, 3.50c.; heavy red brass and light copper, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

Iron and Steel Institute Meeting at York

Announcement is made by the secretary, G. C. Lloyd, of the autumn meeting of the Iron and Steel Institute, which will be held at York, England, Sept. 5 and 6. On Thursday, Sept. 7 the members will visit the Devonshire Works of the Staveley Coal & Iron Co., Ltd., near Chesterfield, and on Friday the works of Parkgate Iron & Steel Co., Ltd. On Tuesday, following the afternoon session of the institute, the members are invited by William McConway, Pittsburgh, to attend a film demonstration at the Theatre Royal, York, of the new McConway process for the production of steel discs by the centrifugal hydraulic method direct from molten steel.

The following papers are announced:

"The Changes of Volume of Steels During Heat Treatment" (1. Air Hardening Nickel Chromium Steels), by L. Aitchison.

"Nitrogenization of Iron and Steel by Sodium Nitrate," by L. E. Benson.

"A Brinell Machine Attachment for Use with Small Specimens," by E. D. Campbell.

"A Preliminary Magnetic Study of Some Heat-treated Carbon Steels," by E. D. Campbell and Mr. Johnson.

"Some Experiments on the Flow of Steels, at a Low Red Heat, with a Note on the Scaling of Heated Steels," by J. H. S. Dickenson.

"An Investigation on the Factors Influencing the Grain and Bond in Molding Sands," by C. W. H. Holmes.

"Practical Notes on the Manufacture and Treatment of High-speed Steel," by H. K. Ogilvie.

"The Bases of Modern Blast Furnace Practice," by A. K. Reese.

"Reversing Cogging Mills: Their Drives and Auxiliary Equipment," by G. A. V. Russell.

"The Diminution of Lag at Ar 1 Through Deformation," by J. H. Whiteley.

PERSONAL

Arthur Whitcraft, manager manganese steel sales of the Hadfield-Penfield Steel Co., in addition to his previous duties, has been placed in charge of all foundry operations at the South Works at Bucyrus, Ohio.

Wm. H. Lolley, special representative for the Standard Parts Co., sailed for Europe Aug. 1. He will make negotiations with German and French interests for the manufacture and sales promotion of Bock taper roller bearings on the Continent, and will visit the British Bock Bearings, Ltd.

William Ochse, whose appointment as efficiency engineer of the Ohio Machine Tool Co., Kenton, Ohio, was announced in this column a few months ago, has been promoted to works manager.

F. D. Gordon has been appointed manager of the Gary Screw & Bolt Co. works, Gary, Ind., succeeding C. E. Carr, who had been manager for a number of years.

L. H. Williard, for the past two years representative of the Carnegie Steel Co. in Washington on armor plate matters, has been transferred to the general offices of the company in Pittsburgh.

A. C. Acker, formerly electrical engineer at the Shaw works, Manning, Maxwell & Moore, Inc., Muskegon, Mich., has been appointed sales engineer and will work out of the Pittsburgh office of that company.

E. W. Reitzel, treasurer MacWhyte Co., Kenosha, Wis., manufacturer of wire rope, cable, etc., has resigned to engage in other business at Chicago. H. G. Sawyer, Oak Park, Ill., has been elected treasurer in his stead.

Lewis J. Whitney, treasurer Osgood-Bradley Car Co., Worcester, Mass., since 1920, has resigned to accept a position with the Perkins Oil Well Cementing Co., Los Angeles. He became associated with the Worcester company in 1909.

Col. Lindley D. Hubbell, vice-president and in charge of operations of the Hendee Mfg. Co., Springfield, Mass., maker of motorcycles, has retired owing to ill health. He is succeeded by Frank J. Weschler.

Harry W. Hultgren, sales and traffic manager Skinner Chuck Co., New Britain, Conn., has resigned. He was associated with the company twelve years. He has made no plans for the immediate future.

Herbert H. Wheeler, secretary Union Mfg. Co., New Britain, Conn., maker of chucks, iron castings, etc., has returned from a three months' European business trip.

Col. Elmer H. Havens, formerly president and one of the Federal receivers of the Locomobile Co. of America, Bridgeport, Conn., has been chosen vice-president and general manager of the Locomobile Corporation of America, recently formed by W. C. Durant, who has purchased the business.

J. A. McCrory, formerly secretary and general manager of sales of the American Steel Co., Pittsburgh, and C. T. Baird, who was president of Charles T. Baird & Co., have formed a partnership under the firm name Baird & McCrory, Inc., with offices at 140 Nassau Street, New York.

A. H. Hudson, at one time associated with the late Edward Hagar when president of the Universal Portland Cement Co., and later in charge of purchasing for the American International Steel Corporation when Mr. Hagar was president of that organization, and who resigned in 1919 to go into business in Chicago, is now representing, with headquarters in New York, the Service Motor Truck Co., Wabash, Ind., manufacturer of a self-contained railroad passenger car employing a gasoline engine.

George M. Gillette has resigned as president of the Minneapolis Steel & Machinery Co., Minneapolis, after an official connection extending over 20 years. For 12

years prior to that time he was secretary of the Gillette-Herzog Mfg. Co. Mr. Gillette was a member of the commission appointed by the governor of Minnesota which spent four years in studying workmen's compensation in the United States and Europe, and he had much to do with framing the compensation act now in force in Minnesota. His successor as president of the Minneapolis Steel & Machinery Co. is yet to be chosen. Mr. Gillette remains a member of the executive committee and the board of directors.

I. H. Bragg, formerly manager of the Portland, Ore., warehouse of Waterhouse & Lester Co., is now associated with the Inland Iron Co., Fresno, Cal.

Irving S. Kemp, formerly sales manager of the Vaughan & Bushnell Mfg. Co., Chicago, has become vice-president of the Evansville Tool Works, Evansville, Ind.

J. Leonard Replogle returned to New York from a European trip, Aug. 5.

Richard Sanderson, vice-president Standard Steel Works Co., Philadelphia, underwent a serious operation this week at a hospital in Camden, N. J.

E. G. Grace, president Bethlehem Steel Co., has returned from Europe.

William P. Woodside, Studebaker Corporation, Detroit, Mich.; Wells K. Gregg, Milwaukee, and Earnshaw Cook, Towson, Md., have been proposed for membership in the Iron and Steel Institute, and their names are on the voting list for the autumn meeting, which will be held at York, England.

Don. H. Gordon, who has been in charge of the Cincinnati office of the Brier Hill Steel Co., as district manager of sales, has resigned his position to accept an executive position with the Niles Steel Products Co., Niles, Ohio. W. F. Rummell will have charge of the Cincinnati office, working out of the Cleveland office.

William A. Schuyler has resigned as president and general manager of the Scintilla Magneto Co., Inc., which is controlled by Brown, Boveri & Co., of Baden, Switzerland. He was formerly associated with the late Edouard Nieuport, the inventor of the Nieuport airplane, and he represented the Nieuport interests in the United States. Later he introduced the Simms magneto to the American market. Soon after the beginning of the world war he spent considerable time in Russia as the representative of American made motor vehicles and machinery, and later was European sales representative of the General Motors Export Corporation. When the United States was at war he was with the bureau of aircraft production. He plans to make an extended trip to Europe.

James T. Waite, for the past ten years New England sales engineer for the Whitman & Barnes Mfg. Co., assumed management of sales for the New Process Twist Drill Co., Taunton, Mass., on July 1.

George F. Davie, vice-president and treasurer Interstate Iron & Steel Co., Chicago, accompanied by Mrs. Davie, sailed on the Montcalm from Montreal, July 28, for Liverpool. They will visit the British Isles, Belgium, Germany, Switzerland, Italy and France and will return late in September.

Charles C. Hill, general superintendent Schoenberger Works, American Steel & Wire Co., Pittsburgh, for the past nine months, and whose connection with that plant goes back 30 years, has been appointed general superintendent of the Newburg Steel Works of the same company, Cleveland, succeeding B. D. Quarrie, who resigned recently to go with Otis Steel Co., Cleveland. Mr. Hill's first connection with the steel industry was as a clerk at the old Twenty-sixth Street works in Pittsburgh, and since he has successively been chief timekeeper, chief clerk, night and day superintendent of the Bessemer department, and assistant general superintendent, which position he held for about nine months before being made general superintendent. Mr. Hill's successor at Schoenberger works has not yet been named.

FRENCH EXPORTS DECLINE

Lower German and British Exchange Curtails
French Sales—Domestic Market Dull
Except for Sheets

(Special Correspondence)

PARIS, FRANCE, July 27.—With the exception of sheets the iron and steel market is dull. The fall of the German mark to 0.0235 fr. has strengthened the position of Germany in export markets to the detriment of French exports, which were also unfavorably influenced by the recession of the pound sterling to 53 fr. after having touched 58 fr.

Germany delivered to France, in June, 374,646 metric tons of coke on the reparations account. But France, whose own production of coke is only about 80,000 tons per month, imported in June 52,942 tons from Belgium and 5181 tons from Great Britain.

As French pig iron producers do not wish to increase the production of pig iron at present, these coke supplies, supplemented by some coking slack coal from Germany, were sufficient to meet the needs of the blast furnaces. But the situation might be quite different with a greater number of blast furnaces in operation.

Iron Ore.—The iron ore market is slowly improving and the following prices have been paid lately:

	Francs
Siliceous ore, Longwy.....	9.50 to 14.50
Minette, Briey	14.00 to 15.00
Minette, Thionville, 32 per cent.....	11.50

Negotiations have been opened with British blast furnaces and coal mines for an exchange, via northern French ports, of iron ore from Briey for British coke and coal for French iron works and railroads and other public utilities.

Pig Iron.—Production no longer shows any increase. With the rise of the coke price to 97 fr. for August, French furnaces are exercising care to prevent an excess of production, which would increase the price decline. The current price of chill-cast foundry pig iron, No. 3 P. L., is 207 to 210 fr., with quotations as low as 205 fr. and up to 215 fr. per metric ton. A contract for 1000 tons of basic was made a few days ago at 195 fr., producing works.

British East Coast hematite, mixed numbers, is now worth 300 to 310 fr., delivered French northern ports. The present prices of the Comptoir des Fontes Hématites are as follows:

	Fr. per Metric Ton
Northern and western coast area.....	295 to 305
Eastern area	305 to 315
Center and Paris area.....	325 to 330

Semi-Finished Steel.—There is more activity in export than in domestic sales. However, works are not booked as full as they were some time ago and orders are being accepted for delivery within a month or six weeks. The present inland prices for mild steel are:

	Francs
Ingots	290 to 300
Blooms	310 to 320
Billets	330 to 340

For export: 5 fr. (French), less f.o.b. Antwerp than the above prices.

Beams.—The Comptoir Sidérurgique decided, at its meeting July 20, to maintain its base price on beams at 475 fr. This decision was taken against the advice of some members of the Comptoir, who, because of the increase in the price of coke for August, favored a higher price. The quotation of 475 fr. was introduced at a time when coke cost the blast furnaces 75 fr. at the Franco-German frontier, compared with the August price of 97 fr. A few small deals in beams for export were recently concluded at 360 fr. f.o.b. Antwerp (French currency).

Rails.—A contract for 4000 to 5000 tons of grooved rails, for the Pekin tramways, to be delivered at Antwerp before Sept. 15, has been taken by a mill of Meurthe-et-Moselle against keen competition from the United States.

Sheets.—The volume of orders taken by the Comptoir des Tôles is still increasing: 30,000 to 32,000 tons

in May, 35,000 to 38,000 tons in June, and a still higher rate in July. These figures include orders received by members from their branches. Delivery is now 10 weeks for light sheets and 6 weeks for heavy sheets.

Plates.—On the option of 50,000 tons of plates taken a few months ago with the Comptoir des Tôles by French shipbuilding companies, about one-half has been taken up. To enable them to purchase the other half, the shipbuilders have asked the Comptoir des Tôles to make an effort to obtain from mills advantageous prices for 17,000 tons of special shapes which they need.

Germany has requested that her coal deliveries on the reparations account to France, Luxemburg, Belgium and Italy, amounting monthly to 1,916,000 metric tons of coal and coal equivalent (of which 1,150,000 tons goes to France) be reduced to 1,340,000 tons, as follows: 400,000 tons of coke (equivalent to 533,000 tons of coal); 150,000 tons of coking slacks; 507,000 tons of other coals; 150,000 tons of briquettes of lignite.

The Reparations Commission has decided that from Aug. 1 to Oct. 31 the monthly quantity of coal and coal equivalent to be supplied by Germany, on reparations account, to the four countries shall be 1,725,000 tons: 620,000 tons of coke (equivalent to 826,666 tons of coal); 100,000 tons of coking slacks; 798,334 tons of other coals and briquettes of lignite.

The 1,725,000 tons will eventually be increased by 20 per cent of any surplus production of the German coal fields (not lignite), Upper Silesia excepted, beyond 8,300,000 tons per month.

OBITUARY

FRANK TOOMEY, SR., founder of Frank Toomey, Inc., and a noted figure in the machine tool trade, died Wednesday morning, Aug. 2, at the home of his daughter, Mrs. S. Guy Megargee, Scranton, Pa., after a brief illness. He was born in Liverpool, England, 72 years ago, and came to this country when a young man and became affiliated with the Baxter Engine Co., Hartford, Conn. He had charge of its Centennial Exposition exhibit at Philadelphia in 1876. In the same year he established the business which now bears his name. He was among the first to rebuild used equipment. In 1909 the business was incorporated and he retired from the presidency in 1916 to be succeeded by his son. The corporation will be conducted by the present officers, Frank Toomey, Jr., being president.



FRANK TOOMEY

WALTER H. BROWN, sales manager Standard Supply & Equipment Co., Pittsburgh, was killed in an automobile accident on the evening of Aug. 1. For more than twenty years prior to becoming affiliated with the Standard company he was associated with the Pittsburgh Gage & Supply Company, Pittsburgh, of which he had been sales manager for a period of ten years. He was 40 years old.

CHARLES S. REA, vice-president and Pittsburgh district sales representative of the Ralston Steel Car Co., Columbus, Ohio, died at the Allegheny General Hospital, Pittsburgh, Aug. 1, following an apoplectic stroke. He was 63 years old and had been a prominent figure in commercial and civic affairs in Pittsburgh.

WILLIAM HEWITT, Trenton, N. J., formerly vice-president Trenton Iron Co., died Aug. 2 in Philadelphia, following an operation of the throat. He was 68 years old.

CHARLES G. COOPER, founder of the C. & G. Cooper Co., Mt. Vernon, Ohio, long conspicuous as a builder of Corliss type of steam engines, died at his home in that city on Aug. 4, at the age of 75.

Let Steel User and Steel Maker Co-operate (Concluded from page 348)

these results can be obtained in a 15 or 20-in. diameter forging. Were the engineer to attempt to purchase a forging requiring such high properties, the reliable steel manufacturer would try to discourage such requirements, but the engineer might find some one hard up for work who would try to furnish it, and the chances for its giving satisfactory service would be very slight.

I believe I am safe in stating that cement machinery must stand as much or more abuse than machinery for most other industries, on account of the abrasive materials handled and the considerable amount of dirt and dust always found in the cement plant which becomes imbedded in bearings. Some parts must stand both wear and shock, and some must stand either shock alone or wear alone. In the case of parts which must stand both wear and shock, a happy combination can be obtained by means of case hardening the outside surface, which will resist wear, retaining a strong and tough core to resist shock. In the case of a part which is not subjected to shock, this can be made of a steel which can be hardened throughout. In the case of a part which must stand severe shocks and vibrations, certain steels can be specifically heat treated to stand up for this service.

It is my impression that certain parts, such as gudgeons, liner plates for tube mills and crushers, are expected to wear out in a certain length of time, and replacing material is ordered without investigating the possibility of obtaining a material which will give double the service or better. It seems that breakages and excessive wear are accepted as a matter of course by many cement plants. There are manganese steel castings made which stand up best under certain conditions at one plant, while some other special steel casting or forging will give better service at another plant. Each plant has its own individual problems which can be worked out by the proper co-operation with reliable steel manufacturers.

Take pinions, for example. Cast iron pinions are cheapest if the first cost is considered only. Occasionally a cast iron pinion makes an exceptional record, but how often is a cast iron pinion obtained which wears out or breaks in a short time, usually breaking before being worn out, and where the cost of labor and curtailment of production on account of repairs would make the ultimate cost considerably higher than if good special-steel, heat-treated pinions had been purchased in the first place.

Quality According to Price

When a cement company wishes a forging and is only willing to pay a certain limited price per pound it will receive a forging which is worth the price paid for it and no more, since in order to make a forging at such a figure the steel manufacturer will have to select his steel accordingly, and perhaps at this price he cannot afford to heat-treat it. If a forging is required, payment of a fair price to a reliable manufacturer will secure a special steel properly selected and will insure careful heat treatment for the service required. Though such a forging might cost three times as much per pound, it would probably last more than three times as long. But if it outlives the lower priced forging only $2\frac{1}{2}$ times, it would be cheaper in the end, on account of continued operation during this extended period and saving on cost of taking down and reassembling.

In the case of the steel casting failures on the jaw crushers mentioned earlier in this paper, these castings would no doubt have been cheap at 50 cents a pound if they had not broken.

Co-operation Between Designer and Metallurgist

In our corporation, we find it valuable for our plant engineers and engineers who are designing or building machinery to keep in constant touch with our metallurgical departments. When they design a machine to perform a certain operation, they first consult the metallurgists to determine which steel will best

stand up in service, and the physical properties which can be obtained from this steel, and they then design their machinery accordingly. In some plants the designing engineer will design his machinery independent of metallurgical advice and make some parts so light and at the same time requiring extremely high physical properties, that he works a hardship on the metallurgical and heat-treating departments. The latter then resort to the use of high priced alloy steels, which may be very sensitive to heat treatment, and which may crack and distort during the drastic heat treatments needed to obtain the extremely high physical properties. This results in high shop losses and often in the installation of defective parts, causing failure in service. Where there is close co-operation between the engineer and metallurgist, such a condition is not likely to occur, and although the machinery may be somewhat heavier, it will be more efficient.

The metallurgist finds it necessary many times to consult with the engineer before recommending steels for certain parts in order to become acquainted with the exact details of the duty which the particular parts are to perform. We find in our corporation that neither can get along without the other, and certainly this same condition must hold true with the cement industry or any other industry using iron or steel.

Far East a Market for American Labor-Saving Machinery

That there are numerous possibilities for business with the Far East and that there is a good market there for labor-saving machinery of all kinds, is the impression of Henry Harnischfeger, president Pawling & Harnischfeger Co., Milwaukee, Wis., builder of cranes and machine tools, who recently returned from an investigation of business conditions in Japan, China and India.

The Far Eastern countries, says Mr. Harnischfeger, are suffering from the effects of the world-wide business depression, since there is a large overstock of materials of all kinds, which must be used up before new supplies will be needed. Contrary to the general opinion, there is a growing market there for labor-saving machinery of all kinds. This is because of the fact that labor conditions are slowly reaching a point where costs of construction and manufacture are high.

He found considerable activity in large engineering projects, such as power plants, drainage, irrigation and building construction. There is a large amount of construction work to be done in the interior of India, says Mr. Harnischfeger, but up to this time it has been particularly hazardous because of loss of life among workmen through wild beasts and reptiles. It is believed that this work can be done very much more safely with the use of machinery.

Mr. Harnischfeger finds the Indian people well disposed toward American-made products. They feel that owing to the vastness of their own country and also of the United States we have had problems similar to theirs and for this reason the machinery designed for the construction of such developments as the Erie barge canal, the Panama canal, the Mississippi flood control and the several gigantic irrigation projects will meet their conditions. These experiences have not been shared by European manufacturers, he emphasized, as they have never had to contend with such large scale enterprises.

The Pittsburgh Steel Co. has received a Federal permit to construct a loading dock on the right bank of the Monongahela River, 3300 ft. above Dam No. 4. The loading dock is for the transfer of materials from railroad cars to barges. Principal material to be handled is slag, cinder and mill refuse, which is to be used in filling and reclaiming other lands of this and allied companies along the river. The American Manganese Mfg. Co., Dunbar, Pa., also received a Federal permit to construct a tipple for the purpose of loading coal in barges on the right bank of the Monongahela River, 6974 ft. west of Point Marion, or 1.3 miles above Lock and Dam No. 8.

GERMAN PRICES AGAIN RAISED

Continued Collapse of the Mark Makes Further Advances Likely—Imports Balance Exports
(By Cable)

BERLIN, GERMANY, Aug. 4.

The new exchange collapse produced convulsive activity in the steel market, the violent demand increasing the shortage of heavy semi-finished products. Prices are rapidly rising. Effective Aug. 1 the Eisenwirtschaftsbund raised all hematite pig iron from 8265 to 11317 m. (from \$11.80 to \$16.20) per metric ton. Other grades were increased correspondingly.

The Steel Syndicate has also raised all prices, ingots being increased from 8520 to 14,480 m. (from \$12.20 to \$20.50) and bars from 11,470 to 19,470 m. (from \$16.40 to \$27.80).

Both the Eisenwirtschaftsbund and the Steel Syndicate have called new meetings to discuss further price increases.

As a result of these new price levels and the home shortage, imports of pig iron and other staple iron and steel products are now about balancing the exports. Exports of pig iron, January to May inclusive, totaled 83,555 metric tons against imports of 99,154 metric tons. Exports of bars, girders and bands were 217,488 metric tons, compared with imports of 211,051 metric tons.

Thin Aluminum Foil Made in Germany

During the war aluminum became more or less one of the substitute materials in Germany, being used in a number of instances in place of copper, steel, tin, and so on. After prolonged research, Dr. H. C. Paullsen has succeeded in rolling aluminum into foil 1/200 mm. in thickness and has also evolved, as a result of further experiments, a method of annealing it so as to make it as pliable as tin foil, according to the London *Ironmonger*. In all respects aluminum foil is very similar to tin foil, and may be colored and printed in the same way.

The great advantage obtained by the use of aluminum foil is, of course, its lightness. It appears that in Germany it is largely used for covering chocolate candies and that, indeed, there are now very few chocolate manufacturers who do not use it. Cigarette factories are also making use of this foil. These and similar applications have so extended the manufacture in Germany that a syndicate has been formed, comparable with the steel syndicate, to watch the interests of producers and to promote research on the development of the product.

Electricity and the Italian Steel Industry

The Italian steel industry and its rapid growth, due to application of electrical power, is discussed by Dr. Dornhecker in *Stahl und Eisen* for June 1. The desire to be independent of coal, which has to be imported, and to use the available water powers, has brought about a marked expansion of electric furnace operation in the Italian steel works and foundries.

Specially noteworthy is the widespread use of furnaces of large capacity, a very careful estimate gives at least 25 furnaces of 10 to 15 tons capacity in operation, while the number of furnaces over 2 ton capacity amounts to at least 50. The furnaces are distributed as shown in the following data, although in regard to the smaller plants the information may not be entirely accurate:

J. Gio. Ansaldo Co., at Aosta:
4 Heroult furnaces, each 15 tons.
Ansaldo Co., at Cornigliano:
2 furnaces of 2 tons, 2 furnaces 10 tons, Tagliaferri system
Longhards Steel & Iron Co., at Sesto S. Giovanni:
5 Heroult furnaces of 15 tons.
2 arc furnaces of 3 tons, Bassanese system. (This is a modification of the Stassano furnace.)

Fiat Co., at Turin:

6 furnaces of 5 tons, 2 furnaces of 20 tons, Fiat system.

Italiana Ernesto Breda Co.:

6 Heroult furnaces of 15 tons.

5 Stassano furnaces, 3 to 5 tons.

2 Stassano furnaces, 2 tons.

Stalimenti di Dalmine (Mannesmann):

4 Heroult furnaces of 15 tons.

2 Heroult furnaces of 6 tons.

Franchi Gregorini, at Brescia:

1 Heroult furnace of 15 tons (at Allione).

2 smaller Heroult furnaces of 2 tons (at S. Eustacchio, Brescia).

Giuseppe Redaelli and Brothers, Mailand:

2 arc furnaces of 8 to 10 tons.

Calcotto Steel Co., at Lecco:

1 arc furnace of 8 to 10 tons.

Italian Tubi Togni Co., at Brescia:

2 electrometal furnaces of 4 tons.

1 electrometal furnace of 2 tons.

Fonderia Milanese di Acciaio, at Mailand:

2 electrometal furnaces of 4 tons, 6 furnaces of their own design between 2 and 4 tons.

2 Stassano furnaces of 1 ton. (They also have 4 open-hearth furnaces, 5 converters and 12 cupolas.)

Franco Tosi Co., at Legnano:

2 furnaces of 4 to 5 tons (on gray iron).

4 furnaces from 2 to 5 tons.

Terni:

1 Heroult furnace of 15 tons.

2 Bassanese furnaces of 1 ton.

Metallurgica Marcora Busto Arsizio:

3 furnaces of 3 to 5 tons.

Manfredi Bongiovanni Cinnes:

2 electrometal furnaces of 2½ to 5 tons.

2 Bassanese furnaces, 1 ton.

The remainder of the paper consists of a description of the new Fiat furnace and foundry. This furnace was described in *THE IRON AGE*, July 20, 1922, p. 151. Every effort has been made to shorten the melting time and prevent loss of heat through the various openings, especially those in the roof for the electrodes. The consumption of Acheson graphite electrodes in these furnaces has been reduced to 2½ kg. per metric ton of product (5.6 lb. per gross ton). The furnaces are of 5 to 6 tons capacity, and seven casts are made per 24 hr. In the original paper is given a cross section and plan of the new foundry, the buildings of which are of reinforced concrete, and the detailed description shows the importance of this modern Italian plant.

G. B. W.

The Australian Steel Trade

The directors of the Broken Hill Proprietary Co. have issued a statement, according to the London *Ironmonger*, giving a gloomy picture of the industry, which, they say, is closing down solely from an inability to secure orders at prices below those for which products can be imported. Great Britain and America, it is added, are enabled to compete owing to reductions in the prices of coal and wages. The works would be able to restart if large coal were reduced by 4s. and small coal by 6s. per ton, and if a 48-hr. week were reconstituted before operations are recommenced. Moreover, the company is unable to start at the New South Wales basic wage of £3 18s. per week, but could restart at a minimum wage of £3 10s.

British Columbia Steel Plant Proposed

Legislation for the establishment of iron and steel works in British Columbia will be put through at the next session of the legislature, according to John Oliver, Victoria, B. C. The announcement was made following a cabinet meeting to representatives of the Coast Range Steel Co., a \$15,000,000 corporation organized last year under H. J. Landahl. According to the announcement the British Columbia Government will unite with the British and Dominion Governments and guarantee as its share bonds not to exceed \$4,000,000. Under plans which have been discussed between interests of the Coast Range Steel Co., the British Columbia Government and the Imperial Board of Trade, a plant to cost \$12,000,000 and have a capacity of 120,000 tons of steel per annum will be constructed in the province.

BRITISH FOREIGN TRADE

June Steel Exports Second Smallest of the Year—Imports Very Low

The June official returns of British foreign trade in steel and iron show that the total exports were 249,089 gross tons. This is a decrease of 51,892 tons from May. The June exports are next to the smallest for the year, February being 228,370 tons, and compare with a monthly average of 267,047 tons for the first quarter. In June, 1921, the exports were only 66,301 tons. In these totals scrap is included. For the first six months of this year the total exports were 1,625,635 tons compared with 879,130 tons for the same period in 1921.

The June imports were 58,856 tons, or the lowest this year. The monthly average for the first quarter was 82,536 tons. In June, 1921, the imports were 88,083 tons. These figures also include scrap. The following table shows comparative data:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
April, 1922.....	274,422	72,074
May, 1922.....	300,981	72,427
June, 1922.....	249,089	58,856
Aver. per month, first quarter, 1922....	267,047	82,536
Aver. per month, second quarter, 1922....	274,830	67,785
Aver. per month, 1921.....	144,885	152,734
Aver. per month, 1920.....	274,881	128,685
Aver. per month, 1919.....	188,519	50,801
Aver. per month, 1913.....	420,757	195,264

The following table covers the principal exports:

	Principal British Exports, Gross Tons			
	Average per Month			June
	1913	1921	1921	1922
Pig iron.....	78,771	8,602	10,269	43,402
Steel rails.....	41,676	14,698	1,173	10,928
Steel plates.....	11,162	10,673	1,336	3,745
Galvanized sheets.....	63,506	17,635	4,471	35,432
Steel bars.....	20,921	8,927	2,115	15,961
Tin plates.....	41,208	18,873	8,801	37,134
Black plates.....	5,679	1,178	419	3,784
Steel sheets.....			684	15,180
Total exports, first 6 months, 1922.....				1,625,635
Total exports, first 6 months, 1921.....				879,130

As in April and May exports of steel rails, galvanized sheets, pig iron and tin plate have shown the most marked recovery. To this must be added steel sheets and bars.

Pig iron imports in June were 4,082 tons compared with a monthly average in 1921 of 55,564 tons.

Iron ore imports in June were 270,924 tons, which compares with a monthly average in 1921 of 157,298 tons.

Manganese ore imports in June were 18,798 tons. Last year they were 14,405 tons per month and in 1913 they were over 50,000 tons per month.

Growth of Gray Cast Iron

In the April number of the Science Reports of the Tohoku Imperial University, Japan, Tario Kikuta discusses "The Growth of Gray Cast Iron During Repeated Heatings and Coolings." In summarizing his investigations, the author states that it is improbable that the growth of gray cast iron during repeated heating and cooling through the A₁ range is caused by the pressure of occluded gases, in the manner as conceived by Prof. Okôchi and Mr. Satô.

As the result of measurements of the density found in specimens after different heat treatment and also of thermal dilatation during heating and cooling continuously, the author concludes that the growth of gray cast iron during the first heating through 700 deg. to 800 deg. is partly attributable to the decomposition of cementite. The continuous growth of gray cast iron in a vacuum during repeated heating and cooling through the A₁ range is the effect of the differential expansion at different microportions of the same specimen, numerous fissures or cavities being thus formed in the region of graphite flakes. In an oxidizing atmosphere, the growth is accelerated by oxides formed and filling the fissures or cavities during A₁ transformation.

Thus, it will be seen, the effect of oxidation on the growth of cast iron is indirect. The growth of white cast iron is almost completed in the first heating to

800 deg. About one-third of the whole expansion is due to the decomposition of eutectic and pearlitic cementites, and the other two-thirds to the minute fissures or cavities formed by the irreversible expansion in different microportions of the same specimen.

The elongation observable at higher temperature than the A₁ point is due to the pressure of occluded gases, as conceived by Prof. Okôchi and Mr. Satô. From the results of the present investigation, the author concludes that the oxidation theory put forward by Rugan and Carpenter seems to be untenable.

United States Principal Importer of Cleveland Iron

The United States was the principal importer of Cleveland pig iron from England in June, according to Russell M. Brooks, vice consul at Newcastle-on-Tyne, who reports the figures to the Department of Commerce.

The total iron exports from the Cleveland district in June were 71,969 tons, a drop from 79,389 tons in May and 86,902 tons in April. Loadings to the United States constituted more than one-fifth of June's total, amounting to 16,025 tons, or 7125 tons more than this country took in May, thus placing America at the head of importers of Cleveland iron.

An important agreement between Cumberland pig iron makers and blast furnace men has been concluded under which the wages of the employees will continue to be regulated by the 1919 sliding scale agreement until the middle of October, 1922. This means that there will be no further reduction below 35½ per cent (corresponding to £4 18s. 6d. per ton for iron) on standard rates in the wages of blast furnace men until the commencement of second full pay in October of this year.

If at that time the ascertained prices justify an advance in wages the men will be paid the increase. By this the question of fixing new rates of wages for the industry is postponed until October, when it is hoped that more stable conditions will prevail in the English iron trade. Any stoppage of work threatened is now averted until future arrangements can be made.

IRON AND INDUSTRIAL STOCKS

Securities Have Continued to Fluctuate in Narrow Limits

The movement of prices for iron and industrial stocks the past week indicated no abnormal apprehension on the part of industry. Securities have fluctuated within narrow limits. This fact possibly is explained in part, at least, by general business, which continues remarkably good despite strike handicaps. Increased car loadings and receding surplus idle equipment impress one with the country's commercial vitality and ability to earn a fair return on property investment.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. 53	- 54½	Lima Loco. 108½-110½
Allis-Chalm. pf.	- 98½	Lima Loco. pf. 53½-55½
Am. B. S. & F. 64¾	- 65½	Midvale Steel 33¾-35½
Am. Can. 58	- 61½	Nat.-Acme 16½-17
Am. Can. pf.	- 109	Nat. En. & Stm. 54½-55½
Am. Car & Fdry. 168	- 172	N. Y. Air Brake 80
Am. Car & F. pf.	- 123	Nova Scotia Stl. 11
Am. Loco. 118	- 121½	Otis Steel 57
Am. Loco. pf. 117½	- 118	Otis Steel pf. 96½
Am. Radiator 101½	- 104½	Pitts. Steel pf. 82
Am. Rad. pf.	- 119	Pressed Steel 100
Am. Stl. Fdries. 37¾	- 39	Pressed Steel pf. 109½
Am. Stl. F. pf.	- 99¾	Ry. Stl. Spring. 32
Bald. Loco. 119	- 122¾	Replogle Steel 70½-71½
Beth. Steel	- 74	Republic 91¾-92½
Beth. Stl. Class B 76¼	- 79	Republic pf. 47
Beth. Stl. 8% pf. 97¾	- 98	Sloss 73½-74
Br. E. Stl. 1st pf.	- 74	Steel of Canada 31
Br. E. Stl. 2d pf. 30¼	- 30½	Superior Steel 31
Chic. Pneu. Tool	- 71	Trans.-Williams. 38
Colo. Fuel 30¼	- 31	Un. Alloy Steel. 38
Cruc. Steel 90¼	- 94½	U. S. Pipe. 34
Cruc. Steel pf. 93	- 93½	U. S. Pipe pf. 118½-120½
Gen. Electric 179¼	- 180	U. S. Steel. 100
Gt. No. Ore Cert. 39¾	- 40¼	U. S. Steel pf. 118½-120½
Gulf States Steel 82	- 85	Vanadium Steel. 48¼-50
Inland Steel	- 51	Va. I. C. & Coke 94
Int. Har. 103¼	- 104¾	Westhouse Air B. 94
Int. Har. pf.	- 117	W'house E. & M. 61
Lack. Steel 76¼	- 78¾	

Machinery Markets and News of the Works

MARKET SPOTTY

Business Continues Fair in Some Centers, in Others Dull

Railroad Lists Still Dormant—Market in Cranes Fairly Active—Price Changes Noted

Activity during the week may be described as spotty. This has been the case both as between machine tool centers and also as to the distribution of orders among manufacturers in the various centers reporting fair business. Improvement over the previous two weeks is noted in Cincinnati and the New York market has been fairly active. In the Pittsburgh, Chicago and New England districts, on the other hand, the business done has been very limited.

A good demand for grinding wheels has been noted, the automotive industry taking, perhaps, the most. This has been more or less gradual since March, and is said to have become as good, if not above, pre-war figures.

Confidence is still felt generally that with the railroad and coal situations adjusted sales will expand. In Milwaukee, shops needing tools badly are sending in rush orders. It is expected that the Louisville & Nashville will shortly close on a number of tools.

In prospective business opportunities may be mentioned the Belle City Malleable Iron Co., Racine, Wis., which has undertaken a \$750,000 plant extension. The reported purchase by the Ford Motor Co. of a site for a ten million dollar assembling plant at East Chicago, Ind., ought to mean the purchase of considerable equipment.

The International Harvester Co., after buying a few machines against its inquiry, has indefinitely postponed action on the remainder of the tools listed. The Continental Motors Co. continues to place scattered orders or tools.

In some centers used tools continue in demand, although prices on good second-hand machines are nearly as high as new machines of similar make.

Prices remain substantially unchanged. The Rhodes Mfg. Co., Hartford, has announced a reduction of 15 per cent on its line of small shapers and slotters, and the P. Prybil Machine Co., Inc., New York, a reduction of 10 to 15 per cent on its spinning lathes.

The market in both overhead and locomotive cranes is showing a fair degree of activity. A new stock of used locomotive cranes may become available from the public auction of 36 cranes held by the Government at Boston. The Lima Corporation, Lima, Ohio, has placed six cranes. Further purchases are said to be contemplated.

New York

NEW YORK, Aug. 8.

ATTENTION in this district is still largely focused on the list of the Wright Aeronautical Corporation, Paterson, N. J., on which two used engine lathes have so far been purchased. The remainder of the list is expected to be closed during the current week, both new and used tools being purchased. The General Electric Co., in addition to the seven lathes and six shapers reported bought last week, has placed an order for four 16-in. tool room lathes and will probably close this week on two turret lathes. It has also purchased four special engine lathes for its Lynn shops. The Manila Railroad, Manila, P. I., has ordered a 60-in. tire mill and the American Car & Foundry Co. has purchased a multiple spindle drill.

An inquiry for prices on a small lathe and a shaper has been issued by the Brooklyn Rapid Transit Co., Brooklyn, N. Y. On the whole, the major part of the present business is evidently going to dealers in used tools. One dealer reports orders during the past week for three large 10-in. to 18-in. lathes. Although purchasers as a rule obtain quotations on new tools, they often place the business with sellers of used machinery. The market, however, is fairly active, and with the railroad and coal strikes settled prospects for considerable activity are believed to be good.

Despite the strikes, which are undoubtedly acting as a deterrent upon many companies which would otherwise issue inquiries for cranes, the market in this district on both overhead and locomotive cranes is fairly active. A few inquiries are still pending, among which is the 40-ton overhead

traveling crane to be purchased by Sanderson & Porter, New York, for Frackville, Pa., probably closing sometime this week. Business in new locomotive cranes continues to show improvement as available used cranes become less numerous. A new stock of used locomotive cranes may become available in this district from the public auction of 36 cranes held by the Government at Boston, Aug. 9.

Among recent purchases are:

J. G. White Engineering Corporation, 43 Exchange Place, New York, a 20-ton, 50-ft. boom locomotive crane from the Ohio Locomotive Crane Co.

Canadian National Railways, Toronto, Ont., a 20-ton, 50-ft. boom locomotive crane with bucket from the Industrial Works.

Grand Trunk Railway, Montreal, Que., a 160-ton, wrecking crane from the Industrial Works. This is the second purchased within a month.

Union Pacific Railway Co., Omaha, Neb., a 15-ton, 45-ft. boom locomotive crane from the Industrial Works.

American Car & Foundry Co., 165 Broadway, New York, a 15-ton locomotive crane from the Orton & Steinbrenner Co.

Ballin Construction Co., Utica, N. Y., a 20-ton, 70-ft. boom used Brownhoist locomotive crane from Philip T. King, 30 Church Street, New York.

McClellan & Junkersfeld, 45 William Street, New York, a 110-ton, 55-ft., 6½-in. span, 4-motor, overhead traveling crane for the Union Electric Light & Power Co., St. Louis, Mo., from the Niles-Bement-Pond Co.

Long Island Railroad, Brooklyn, N. Y., a 25-ton 60-ft. span, 4-motor, gantry crane from the Whiting Corporation.

Long Island Railroad, Brooklyn, N. Y., a 10-ton, 58-ft. 3-in. span overhead traveling crane from the Niles-Bement-Pond Co.

Voska Foech Sidlio Marble & Slate Works, Astoria, L. I., a 600-ft. tramrail from the Cleveland Tramrail Co.

Friedman Marble & Slate Works, 654 Vernon Avenue, Long Island City, extension to tramrail system from the Cleveland Tramrail Co.

Town of Springwells, Wayne County, Mich., two 5-ton, 3-motor cranes, 30-ft. and 80-ft. spans, from the Northern Engineering Works.

W. S. Zitterell Co., Webster City, Iowa, a 10-ton overhead traveling crane from the Northern Engineering Works.

H. P. Deuscher Co., Hamilton, Ohio, a 2-ton electric hoist from the Northern Engineering Works.

Salmon Falls Mfg. Co., Salmon Falls, N. H., a 20-ton, 30-ft. 10-in. span, hand power crane from the Roeper Crane & Hoist Works.

Grasselli Chemical Co. for Grasselli, N. J., a 30-ton, 8-wheel, locomotive crane with bucket from the Orton & Steinbrenner Co.

Warner Sugar Refining Co., New York, a 10-ton overhead traveling crane for use in Cuba, from an unnamed builder.

American Radiator Co., Buffalo, N. Y., two 3-ton, 29-ft. span and 18-ft. span and one 1-ton, 47-ft. span electric cranes from an unnamed builder.

The Schumacher Mill Furnishing Works, P. O. Box 2, Port Melbourne, Victoria, Australia, desires equipment for perforating sheets and thin plates and asks for quotations, f.o.b. New York, with illustrations and descriptions of the range of machines needed for perforating work. On deciding what machine seems suitable, payment would be made in New York and shipments made through the company's shipping agent in New York.

The Universal Last Co., 191 Worth Street, New York, is taking bids for a new three-story plant, 80 x 130 ft., for the manufacture of iron lasts, etc., at Clifton Place and Classon Avenue, Brooklyn, estimated to cost about \$100,000, including equipment. William Higginson, 15 Park Row, New York, is architect.

The Ulster & Delaware Railroad Co., 22 Ferry Street, Kingston, N. Y., has awarded contract to the Michand-Campbell Co., Inc., 77 Greenhill Street, for a one-story locomotive erecting shop, 75 x 154 ft. Charles Stowell, company address, is engineer.

The New York Steam Corporation, 280 Madison Avenue, New York, operating power utilities in the downtown district, has arranged for a bond issue of \$1,000,000, a portion of the proceeds to be used for extensions and improvements. James D. Hurd is president.

The Long Island Lighting Co., 50 Church Street, New York, and the Nassau Light & Power Co., Mineola, N. Y., operating power plants and systems in the Long Island district, have been consolidated under the first noted name. The new company is planning for a bond issue of \$3,000,000 and stock issue of the same amount, the proceeds to be used in part for plant extensions and improvements.

Joseph Breslauer, New York, operating an automobile service and repair works at 1986 Crotona Parkway, Fordham, has acquired the vacant property, 75 x 100 ft., on the Southern Boulevard, between 179th and 180th streets as a site for the erection of a new two-story plant.

The New York Central Railroad Co., New York, is making inquiries for a six-spindle bolt-threading and cutting machine, motor driven. C. S. White is purchasing agent.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, has had plans prepared for a twelve-story operating building, for service departments, headquarters, etc., at Wiloughby and Pearl streets, to cost about \$1,000,000. The structure is part of the extension program arranged by the company, to include a new electric generating plant and automobile service building on property recently acquired at Third Street and Fourth Avenue. McKenzie, Voorhees & Gmelin, 1123 Broadway, New York, are architects for the first noted structure.

Thomas A. Edison, Inc., Lakeside Avenue, West Orange, N. J., manufacturer of electrical specialties, talking machines, etc., has leased the building on site 100 x 100 ft., at Freeman Avenue and Hamilton Street, Long Island City, for a new service works and distributing plant.

The New York Harbor Dry Dock Corporation, 32 Pearl Street, New York, will install a new 10,000-ton drydock with additional shop facilities at its yard at Rosebank, S. I. Other enlargements are under way, including the purchase of drydocks owned by the United States Shipping Board and heretofore leased. The company has arranged for an increase of \$1,750,000 in plant investment. Charles E. Fraser is president.

The Hudson Motor Car Co., 1842 Broadway, New York, has leased the new automobile service and repair building, now being constructed on the Grand Concourse at a cost of \$150,000, by the S. & L. Building Co., 1312 Clinton Avenue, and will occupy the structure immediately upon completion.

C. Brandes, Inc., 32 Union Square, New York, manufacturer of wireless equipment, headsets, etc., has arranged for the establishment of a new branch plant at Ottawa, Ont.

The Intercontinental Rubber Co., George H. Carnahan, 120 Broadway, New York, president, is perfecting plans for reorganization, to provide for extensions to the manufacturing plant in Mexico and improvement in properties in Sumatra. It is proposed to dispose immediately of bonds for \$2,000,000, of which approximately \$275,000, will be used for plant additions.

Hoisting equipment, conveyors, loading and unloading machinery, etc., will be installed at the new veneer lumber plant of the J. J. Bonneau Co., 315 East Thirty-fifth Street, New York, to be located on property, 131 x 284 ft., at Long Island City recently acquired.

S. M. DePasquale, 2975 Marion Avenue, New York, will take bids at once on a one-story automobile service and repair building on Webster Avenue, estimated to cost about \$125,000. S. J. Kesler, 529 Cortlandt Avenue, is architect.

W. C. Durant, president, Durant Motors, Inc., 1819 Broadway, New York, is said to be organizing a new subsidiary, to be known as the Mason Truck Co., for the manufacture of motor trucks. The initial plants will be established at Bridgeport, Conn., and Flint, Mich. It will be operated as an independent unit.

The Anaconda Copper Mining Co., 25 Broadway, New York, has tentative plans under consideration for a brass fabricating plant, in connection with its mills at Great Falls, Mont., estimated to cost in excess of \$500,000.

Mechanical unloading machinery, conveying equipment, motors, etc., will be installed at the two new incinerating plants to be constructed by the Borough of Queens, at Woodhaven and Winfield, L. I., respectively, estimated to cost about \$275,000, each. Each plant will comprise two 50-ton units. Edward Richardson, Flushing, and Joseph P. Powers, Rockaway, L. I., are associated architects.

Campbell & Dannatt, Inc., New York, has leased the service works of the Urban Motor Car Co., 112-118 East Seventy-fifth Street, near Park Avenue, for a term of years. A service and repair plant will be operated.

The Standard Underground Cable Co., Perth Amboy, N. J., has awarded a contract to the Turner Construction Co., 242 Madison Avenue, New York, for a three-story and basement addition, 50 x 150 ft.

The Robian Corporation, New York, has leased the new building, 100 x 100 ft., at Tenth Avenue and Fifty-sixth Street, for the establishment of an automobile service and repair works.

The Westinghouse Lamp Co., Watessing district, Bloomfield, N. J., has plans under way for an addition.

Walter Butterfield, Wildwood, N. J., has awarded a contract to Rufus Hayes, Wildwood, for a one-story machine shop, at Holly Beach and Roberts Avenue, 50 x 80 ft.

The Standard Fuse Corporation, Paulsboro, N. J., has disposed of its local plant, constructed during the war, to a Trenton, N. J., manufacturing company, whose name is temporarily withheld. The plant will be remodeled and new machinery installed.

The Pennsylvania Railroad Co., Pennsylvania Terminal, New York, has acquired two tracts of property in the Kearny meadow section, Kearny, N. J., 107 acres, and 26 acres, adjoining, from the Newark Factory Sites, Inc., and the Trexler Lumber Co., respectively. The property will be used for new freight and classification yards, to include engine house, shops, etc.

A vocational department will be installed in the new high school to be erected at Mays Landing, N. J., two stories and basement, 110 x 190 ft., estimated to cost about \$250,000. S. Huson Vaughn, Guarantee Trust Building, Atlantic City, N. J., is architect.

The Spicer Mfg. Co., South Plainfield, N. J., manufacturer of universal joints and other automotive products, will build a one-story addition to cost about \$26,000.

A vocational department will be installed in the new high school to be erected at Clifton, N. J., for which bids on a general contract are being received, estimated to cost in excess of \$800,000.

The J. L. Hamett Co., Cambridge, Mass., manufacturer of school equipment and supplies, will remove its branch factory at Brooklyn to a new four-story plant at 380 Jelliff Avenue, Newark, N. J., totaling about 44,000 sq. ft. of floor space.

The Natural Carbonic Gas Co., McClellan Street, Newark, has plans nearing completion for the erection of a one-story service and repair works, for company trucks and cars, estimated to cost about \$100,000. Henry D. Scudder, Jr., Union Building, is architect.

The Standard Oil Co. of New Jersey, 31 Clinton Street, Newark, has leased the building at 61-63 River Street, for

a new distributing works, with service and repair department for company trucks.

Isaac H. Johnson & Co., Spuyten Duyvil section, Kingsbridge, New York, manufacturers of steel castings, have acquired property in the vicinity of the Spuyten Duyvil Creek and Harlem River Ship Canal, heretofore held by the New York Central Railroad, for future extensions.

The Long Island Railroad Co., Pennsylvania Terminal, New York, has awarded contract to the Turner Construction Co., 242 Madison Avenue, for two three-story and basement buildings at Morris Park, L. I., one to be used as a general shop and the other for warehouse service. L. V. Morris is chief engineer.

Philadelphia

PHILADELPHIA, Aug. 7.

The Standard Steel & Bearings, Inc., Fiftieth Street and Lancaster Avenue, Philadelphia, has plans under way for an addition to its branch plant at Plainville, Conn., to handle a considerable portion of the manufacture now being carried on at the Philadelphia works. Machinery will be transferred from the last noted plant to the Plainville extension.

Thomas B. Martindale, 3437 North Broad Street, Philadelphia, operating a Ford automobile agency, has construction in progress on a new two-story service and repair building, 100 x 265 ft., at Broad Street and Allegheny Avenue, estimated to cost in excess of \$75,000.

The United Electric Construction Co., 1727 Sansom Street, Philadelphia, manufacturer of electric equipment, has leased the three-story building, 43 x 46 ft., at 2318-20 Sansom Street, for extensions.

Frank C. Snedaker & Co., Philadelphia, operating a mill work plant at Ninth and Tioga streets, have filed plans for a two-story addition, 20 x 113 ft.

The Sayre-Level Radio Co., Philadelphia, manufacturer of wireless equipment, has leased a portion of the six-story building at 41 North Tenth Street, for a local works.

The Roberts & Mander Stove Co., Eleventh and Washington streets, Philadelphia, will install a traveling crane in its new two-story plant at Hatboro, Pa.

The Paper Manufacturers' Co., Inc., 526 Cherry Street, Philadelphia, has acquired property at 408-18 North Fifth Street for plant extensions. It is now operating a factory at Thirteenth and Noble streets.

William Gerstley, Philadelphia, has acquired the four-story garage and warehouse building, 110 x 180 ft., at 1825-33 Market Street, for an automobile service and repair plant.

The Bureau of Water, City Hall, Philadelphia, is reported to be planning for the installation of two 3-ton traveling cranes at one of the city pumping plants. C. E. Davis is director.

James T. Finnesey, an official of Finnesey & Kobler, Inc., Twenty-sixth and Parrish streets, Philadelphia, manufacturer of automobile bodies, has awarded contract to Henry C. Dahl, 231 South Eighth Street, for a new building at Taney and Parrish streets, to cost about \$20,000.

The Panelite Board Co., Smith Building, 119-25 North Montgomery Street, Trenton, N. J., recently organized with a capital of \$300,000, has plans under way for a new factory on the Whitehead Road to manufacture fibre products. The initial works will give employment to about 50 men. D. Mason Sutherland, Jr., formerly connected with the Amosote Co., Trenton, manufacturer of similar products, is president.

The Trent Tile Co., Klagg Avenue, Trenton, N. J., has awarded contract to the N. A. K. Bugbee Co., 366 East Hanover Street, for a one-story addition, 50 x 166 ft.

The Detroit Motors, Inc., care of Backes & Schroth, Broad Street Bank Building, Trenton, N. J., representatives, recently organized under Delaware laws to manufacture a six-cylinder automobile, has tentative plans for the erection of a local plant on site being selected. It is also proposed to establish a series of assembling works in a number of leading cities, with local service departments. Offices will be opened at Trenton at once. Milton Wells, formerly connected with Dodge Brothers, Detroit, is engineer and an official of the company.

The Armstrong Cork Co., Camden, N. J., manufacturer of insulating products, with headquarters on Twenty-fourth Street, Pittsburgh, will remodel and improve the plant of the Amson Printing Co., Gloucester City, recently acquired, for a manufacturing works.

A one-story power house, 32 x 50 ft., will be constructed at the new furniture plant of the J. B. Van Sciver Co., Front and Federal streets, Camden, N. J. The Ballinger Co., 105 South Twelfth Street, Philadelphia, is architect.

N. B. T. Rooney, 503 Market Street, Camden, N. J., has had plans completed for a two-story automobile service and repair building, 52 x 100 ft., at Hadden and Sycamore avenues, estimated to cost about \$55,000. A. B. Gill, Law Building, is architect.

The Ajax Rubber Co., Inc., Breunig Avenue, Trenton, N. J., manufacturer of automobile tires, is considering plans for new works at Sandusky, Ohio, estimated to cost in excess of \$500,000, with machinery. Negotiations are under way with the Sandusky Chamber of Commerce for a site.

The Reading Hardware Co., Sixth and Willow streets, Reading, Pa., manufacturer of hardware and specialties, is having plans drawn for a new seven-story addition, 80 x 225 ft. George Gerhard & Sons, 619 Penn Street, are architects.

The Penn Central Light & Power Co., Altoona, Pa., has plans in progress for a new two-story power house at Saxton, Pa., with initial capacity of about 40,000 kw. Day & Zimmerman, Inc., 611 Chestnut Street, Philadelphia, operate the property and are engineers for the new plant.

The Elliott-Blair Steel Co., New Castle, Pa., will soon take bids for its new plant at Mercer, Pa., comprising five one-story buildings, estimated to cost about \$200,000. George D. Blair, Sr., is president.

The Rochester Metal Weather Strip Co., Rochester, N. Y., will establish a branch manufacturing plant at East Stroudsburg, Pa.

Work will soon commence on a new power house, 50 x 76 ft., at the convent of the Sisters of Mercy, Dallas, Pa. James L. Morris, Coal Exchange Building, Dallas, is head of the building committee. F. F. Durang, 1220 Locust Street, Philadelphia, is architect.

The Motor Exchange, Inc., 327 North Third Street, Philadelphia, is said to be in the market for a new chain hoist, about 40 ft. lift.

The Philadelphia Suburban & Electric Co., Jenkintown, Pa., is arranging for an additional appropriation of \$1,500,000, for extensions and improvements in its power plants and system at Jenkintown, Pottstown, Phoenixville and Coatesville, Pa. The company recently voted \$1,938,760 for expansion, making a total appropriation of \$3,438,760 to be used over 36 months.

The Middletown Ice Co., Middletown, Pa., will commence the erection of a new ice-manufacturing plant on Race Street.

A vocational department will be installed in the new two-story high school, 147 x 175 ft., to be erected at Plains, Pa., estimated to cost about \$100,000. Austin L. Reilly, Bennett Building, Wilkes-Barre, Pa., is architect.

The Eastern Pennsylvania Power Co., Pottsville, Pa., will commence foundations at once for its new electric generating plant at Pine Grove, Pa., estimated to cost about \$3,000,000, with machinery. It is expected to require close to 24 months to complete the station.

A bond issue of \$75,000 has been voted by citizens of West Lampeter Township, Pa., for a new vocational high school to replace the school recently destroyed by fire. Henry Y. Shaub, Imperial Building, Lancaster, Pa., is architect.

The Hudson Mfg. Co., Inc., 144 Pearl Street, Trenton, N. J., is in the market for a 16 in. x 5-ft. Monarch lathe, a 20-in. shaper, 24-in. drill press, small tool grinder, two power presses and two kick presses. The officers of the company are W. W. Morell, president; D. A. Ungaro, vice-president, and J. Dale Herron, secretary-treasurer.

Buffalo

BUFFALO, Aug. 7.

The Buffalo General Electric Co., Electric Building, Buffalo, will commence the immediate erection of a new power house at Main and Hertel streets. P. F. Sellers is general superintendent.

O. E. Bray, 1009 Mutual Life Building, Buffalo, is planning to purchase machinery for the manufacture of special concrete blocks and kindred products at a number of plants in this section.

Fire, Aug. 1, destroyed a portion of the plant of the Rochester Composite Brick Co., Rochester, N. Y., with loss estimated at about \$100,000.

The building committee of the Buffalo Club, 388 Delaware Avenue, Buffalo, will build a new power house to cost about \$30,000, in connection with its proposed new club house. A list of equipment is being arranged. H. P. Werner is house commissioner.

The Niagara State Reservation Commission, Niagara Falls, N. Y., has tentative plans under way for the installation of elevating equipment to replace the present stairs at the Cave of the Winds. The elevator, with machinery, will

cost about \$80,000. The State engineer, Albany, will supervise the installation. A. T. Clearwater, 280 Wall Street, Kingston, N. Y., is chairman of the commission.

August Schmidt, Doat Street, Buffalo, is having plans drawn for a new one-story automobile service and repair building, 60 x 100 ft., at Genesee Street and Rapin Place.

The Lindbeck Lumber & Mfg. Co., 16 River Street, Jamestown, N. Y., will install new conveying and other equipment in its plant addition.

The Jerge Motor Corporation, Buffalo, operating a local Ford automobile agency, will establish a new two-story service and repair works in the building at 1647-55 Genesee Street. Edward C. Jerge is president.

The Wood & Brooks Co., Military Road, Buffalo, manufacturer of mechanical player actions, etc., has recently acquired about 25 acres adjoining its plant for proposed expansion.

Shields Brothers, Bombay, N. Y., are arranging for the purchase of motors and other electrical equipment to be installed in their new three-story plant, 90 x 90 ft., for the manufacture of Indian goods, replacing a factory recently destroyed by fire. J. J. Shields is in charge.

The Upco Petroleum Co., Buffalo, has acquired about two acres on Military Road and will commence the immediate construction of a new refinery and distributing plant.

New England

BOSTON, Aug. 7.

THE machine-tool trade in this district the first seven days of August dropped to extremely small proportions. Aside from the Boston school business and the purchase of a thread milling machine by the Wentworth Institute, Boston, nothing worthy of mention has moved the past week. Buying of used equipment also shrunk materially, a milling machine, two screw machines and a large turret machine taken by a Quincy, Mass., company being the largest individual order booked. Manufacturer's representatives and dealers, however, are still working on prospects which in the aggregate total up fairly large.

The trade is confident that with the railroad and coal labor situations adjusted, sales will expand. A considerable amount of special work is being done by New England makers of machine tools for the railroads. Some falling off in such business is anticipated, however, inasmuch as the railroads are slowly increasing shop forces.

The Yale & Towne Mfg. Co. has advanced hoists 5 per cent.

Tentative plans have been made by the Standard Steel & Bearing, Inc., Plainville, Conn., for materially increasing manufacturing space.

Bids are in on a four-story, 80 x 100 ft. manufacturing plant to be erected by the Cambridge Rubber Co., 784 Main Street, Cambridge, Mass. The H. M. Hope Engineering Co., 228 Boylston Street, Boston is the engineer.

The Presbrey-Leland Co., New York, granite, having acquired certain Brattleboro, Vt. property, this fall will erect steel and concrete sheds thereon at an estimated cost of \$150,000. It will require cranes.

Plans are being drawn for the Industrial Buildings, Inc., Bridgeport, Conn., for a five-story, 60 x 300 ft. manufacturing plant.

Bids have been taken on private plans calling for a four-story, 122 x 157 ft. addition to building No. 63 of the General Electric Co., West Lynn, Mass.

The Marine Engineering & Dry Dock Co. and the Lord Construction Co., Providence, have been purchased by Frederick S. Peck of that city. By the purchase Mr. Peck protects a mortgage he held on the property. It is his present intention to sell the machinery and other equipment.

Plans are being drawn for a one and two-story, 88 x 250 ft. garage and service station to be erected at Melrose and Russell streets, Providence, R. I., by the United Electric Railway Co.

The G. Drouvé Co., manufacturer of skylights and factory specialties, Fairfield, Conn., has plans drawn up for extensive alterations at its new plant, recently built. The project calls for about twenty tons of steel.

The Schroeder Brothers Mfg. Co., Inc., Torrington, Conn., has recently been incorporated under State laws with a capital stock of \$100,000 to manufacture machine parts, tools, mechanical hardware, novelties, etc., by Gustave A.

Ernest E. F., Arthur E. R., and Richard F. W. Schroeder. The company has a plant on Brook Street, Torrington.

The Chamber of Commerce, Bridgeport, Conn., is having preliminary plans drawn by Fletcher-Thompson, Inc., engineer, 542 Fairfield Avenue, for a five-story, 60 x 150-ft. reinforced concrete industrial incubator building on Railroad Avenue and Garden Street, to cost about \$250,000.

The Charles H. Harris Co., Inc., Norwalk, Conn., manufacturer of windshield glass, etc., has awarded contract for another plant unit, one-story, 100 x 120-ft.

The New England Brass Mfg. Co., Danbury, Conn., has been incorporated under State laws with a capital stock of \$22,000, by Mary E. Krebs, Mohammed Inamuddin and Joseph Peon. It operates a plant on Maple Street.

A vocational department will be installed in the new high school to be erected at Somerville, Mass., for which an appropriation of \$550,000, has been approved.

F. P. Carpenter, Manchester, N. H., is organizing a company to build and operate a one-story automobile service and repair works on Mechanic Street, to cost about \$65,000. Plans are being prepared by H. W. Rhodes, 574-A Congress Street, Portland, Me.

The Winchester Water Works Co., 14 Beacon Street, Boston, has made application for permission to construct and operate a hydroelectric power plant at the United States Lock and Dam, Kentucky River, near Winchester, Ky.

The Great Northern Paper Co., Greenville, Me., will use the new building at Greenville Junction, now being completed, as a machine shop, for the care and repair of company motor trucks, tractors, trailers, etc., including parts manufacture.

A power house will be constructed at the new State normal school to be erected at New Britain, Conn., estimated to cost about \$750,000. The State Board of Education, Hartford, is in charge. Guilbert & Betelle, 546 Broad Street, Newark, N. J., are architects.

The Quincy Electric Light & Power Co., Quincy, Mass., is arranging for the sale of a bond issue of \$250,000, a portion of the proceeds to be used for extensions and improvements.

A vocational shop will be installed in the new two-story addition to the Lincoln School, Ticonderoga Avenue, Providence, R. I. Jackson, Robertson & Adams, Providence, are architects.

The Nashwaak Pulp & Paper Co., Bangor, Me., operated by officials of the Oxford Paper Co., 200 Fifth Avenue, New York, and the Bryant Paper Co., Kalamazoo, Mich., has plans for extensions and improvements in its mills at St. John, N. B., including equipment for increasing the capacity from 60 to 80 tons a day. The work is estimated to cost about \$500,000.

The National Knife Co., Providence, recently organized, has taken over property at 30 Cory Street, for a local plant. John B. Fazioli heads the company.

A vocational department will be installed in the new two-story and basement high school to be erected at Conway, N. H., estimated to cost about \$100,000. C. R. Whitcher, Beacon Block, Manchester, N. H., is architect.

Gray & Davis, Inc., Cambridge, Mass., manufacturer of automobile starting and lighting equipment, is disposing of a bond issue of \$1,250,000, a portion of the proceeds to be used for extensions and improvements.

Following the recent closing of its Worcester, Mass. plant, the Torrington Co., Torrington, Conn., is planning to manufacture its line of vacuum cleaning machines and parts heretofore carried on at Worcester, in a six-story building at the Torrington plant.

Baltimore

BALTIMORE, AUG. 7.

The Baltimore Concrete Products Co., Baltimore, has filed plans for the erection of a new one-story factory, 55 x 80 ft., at Kate Avenue and the line of the Western Maryland Railway.

The Maryland Motors, Inc., 601 St. Paul Street, Baltimore, is taking bids for a three-story service and repair building at 414-24 North Calvert Street, to cost about \$75,000. Mottu & White, 324 North Charles Street, are architects.

The office of the general purchasing officer, Panama Canal, Washington, will take bids until Aug. 16, for equipment for the canal zone as follows, circular 1489: 350 machine bolts; 2190 ft. brass tubing; 300 ft. galvanized wire netting; 8 boiler ranges; 240 galvanized water buckets; 350 ft. leather belting; 30,000 lb. corrugated roofing; 600 cable slips; 24 turnbuckles, and other miscellaneous equipment.

The Easton Utilities Commission, Easton, Md., will take bids until Aug. 17 for an addition to the municipal electric

light and power plant, including turbo-generator, exciter set, condenser, switchboard, cooling tower, etc.; also, for Diesel or semi-Diesel generating equipment. Carl J. Kiefer, 510 Fourth National Bank Building, Cincinnati, is consulting engineer.

The Southern Iron & Equipment Co., Grant Building, Atlanta, Ga., has inquiries out for a 20-ton, narrow gage, saddle rock locomotive. H. A. Merrill is in charge.

The Bureau of Yards and Docks, Navy Department, Washington, has awarded a contract to W. F. Martens, 112 Empire Building, Rochester, N. Y., for a machine shop at the Naval Base, Pearl Harbor, H. T., to cost \$185,366.

The Hearn Oil Co., Third and Commerce streets, Wilmington Del., has acquired property on Mill Street, Salisbury, Md., for a new storage and distributing plant, estimated to cost about \$35,000. Claude Hearn is manager.

S. T. Williams, 223 North Calvert Street, Baltimore, has inquiries out for a cableway hoisting engine, with winding and endless rope drum for electric drive, 35 to 40 hp.; also, for an electrically-operated air compressor, with or without motor.

The Locke Insulator Co., Baltimore, manufacturer of insulation products for high-tension electric service, will build a new one-story plant addition at Charles and Cromwell streets, estimated to cost close to \$25,000. Plans have been drawn.

The Morris Brothers Co., Greenville, S. C., manufacturer of bobbins and other textile equipment, has awarded a contract to the Gallivan Building Co., for a new two-story plant, 40 x 128 ft. D. L. Morris is president.

The Sumter Ice & Fuel Co., Sumter, S. C., is arranging a list of equipment for installation at its proposed refrigerating and ice-manufacturing plant. E. H. Moses is general manager.

The Hackley Morrison Co., Richmond, Va., machinery dealer, is inquiring for a locomotive crane.

The City Council, Norfolk, Va., will receive bids until Aug. 17 for the erection of a new power house to be used in connection with the municipal terminal project. The Folwell-Ahlskog Co., 600 Seaboard Bank Building, is engineer. Charles E. Ashburner is city manager in charge.

The West Penn Power Co., Pittsburgh, has secured an option for the purchase of the municipal electric power plant at Oakland, Md. The new owner will make extensions and improvements.

T. Herbert Allen, Kenbridge, Va., is inquiring for coal unloading and conveying machinery.

A vocational department will be installed in the new high school to be erected at Kershaw, S. C., for which bids are being asked on a general contract. LaFaye & LaFaye, Columbia, S. C., are architects.

Pittsburgh

PITTSBURGH, Aug. 7.

WHILE the machine tool trade reports a good volume of prospective orders, actual business is very limited and the usual explanation is that buyers are delaying placing orders until there is a settlement of the coal and railroad strikes. The first week of the month indicates that August sales will make a poor showing compared with July and June. The electrical equipment market is not especially active, but the Allis-Chalmers Mfg. Co. recently took a 150-kw. Diesel oil engine generator unit for the Pittsburgh-Idaho Co., Inc. This is a duplicate order. The crane market shows a fair degree of activity.

Recent crane orders include a 50-ton 73-ft. span crane and a 15-ton 77-ft. span crane placed by the Apollo Steel Co., Apollo, Pa., with the Champion Engineering Co., Kenton, Ohio, while the Pittsburgh office of the Milwaukee Electric Crane & Mfg. Co. has taken an order from the Sandusky Cement Co., Cleveland, for a 10-ton 4-motor 80-ft. span bucket crane complete with 3-cu.yd. bucket, and the Northern Engineering Works, Detroit, through its Pittsburgh office has taken a 5-ton 75-ft. span, double hook crane for the Pittsburgh warehouse of the Crane Co., Chicago. The Northern Engineering Works also has taken four pillar jib cranes for the Pennsylvania Railroad, two for installation at the Pileain shops and two for Renova shops. The Shepard Electric Crane & Hoist Co. has taken a 25-ft. crane for Frick Co., Waynesboro, Pa. which also has placed two 5-ton cranes and one 10-ton crane with Maris Brothers, Philadelphia. The Jones & Laughlin Steel Co. has taken bids on two 10-ton cranes and two 15-ton cranes for its Southside works, and the award is expected shortly. The Weirton Steel Co., Weirton, W. Va., in addition to a ladle crane, probably will soon ask for bids on three other cranes, all of mill type construction. The United Engineering &

Foundry Co. has taken bids on three cranes for installation at the St. Louis plant of the National Enameling & Stamping Co. This inquiry includes one 4-motor mill type 40-ton crane with 5-ton auxiliary, 75-ft. span, a 3-motor, 10-ton mill type crane, 75-ft. span, and a 4-motor, 10-ton double drum 35-ft. span crane. The Lima Corporation, Lima, Ohio, recently placed an order for two 150-ton double trolley, 75-ft. span cranes; two 25-ton double trolley, 75-ft. span cranes and two 20-ton double trolley, 60-ft. span cranes, in connection with the extension to its plant.

The Duquesne Light Co., 435 Sixth Avenue, Pittsburgh, will commence the immediate erection of three new power houses, to cost about \$900,000, including equipment. One structure will be located at Maryland and Forest avenues, Bellevue, Pa.; another in the Northside District, Pittsburgh, at Sandusky and North Diamond streets and the third at Penn and Swissvale avenues, Wilkinsburg.

The McKays Carriage Works, Erie Street, Grove City, Pa., manufacturer of automobile bodies, will build a one-story addition, to cost about \$16,000. A list of equipment is being arranged.

The Barnett Steel Barrel Co., Los Angeles, Cal., is in negotiation with the Chamber of Commerce, Pittsburgh, for a site for the erection of a new Eastern branch plant to manufacture all-steel barrels. Donald Barnett is head of the company.

A vocational department will be installed in the new three-story and basement high school, 64 x 165 ft., to be erected at Meadville, Pa., for which foundations will be placed under way at once. It will cost close to \$400,000. W. G. Eckles, Lawrence Savings & Trust Building, New Castle, Pa., is architect.

The Standard Motor Car Co., 5748 Baum Boulevard, Pittsburgh, is arranging for the manufacture of a four-cylinder automobile at its recently completed plant at Butler, Pa. It consists of a main assembling works, 200 x 800 ft., with a number of smaller buildings, and will be equipped for an output about 150 eight and four-cylinder motors per day. The company will remove its headquarters to the Butler plant.

The National Auto Service Co., New Kensington, Pa., has completed plans for a new one-story service and repair building, 60 x 70 ft., with extension, 25 x 60 ft., at 1030 Fifth Avenue, estimated to cost close to \$50,000.

The Pittsburgh Nipple & Mfg. Co., Pittsburgh, recently reorganized, has removed its plant from Carson Street to 411 South Main Street, West End, where additional machinery will be provided for large increased output. Ferdinand Manus is president, Charles Fette, vice-president, and George B. Shaw, treasurer.

Hinman Brothers, 1017 Seventh Avenue, Butler, Pa., will build a new two-story automobile service and repair works, 100 x 150 ft., at Green Avenue and Eighth Street, estimated to cost about \$65,000.

The D. N. Carlin Co., 125 Denniston Avenue, Pittsburgh, manufacturer of toys, is taking bids for a two-story addition, 34 x 115 ft., estimated to cost about \$25,000. W. H. Stulen, 101 Market Street, is architect.

The Amicon Fruit Co., 81-87 East Naghten Street, Columbus, Ohio, will soon commence the erection of a new three-story and basement cold storage and refrigerating plant at Williamson, W. Va.

The Moore Lumber Co., Charleston, W. Va., is planning for the installation of a new band mill, industrial locomotive, trucks and other equipment.

The Raleigh Motor Co., Beckley, W. Va., is completing plans for a new three-story service and repair building, 50 x 145 ft., on East Main Street, estimated to cost about \$65,000. H. M. Miller, Roanoke, Va., is architect.

The Fesenmier Packing Co., Madison Avenue and Fourteenth Street, Huntington, W. Va., will remodel a local building for a new ice-manufacturing and cold storage plant, estimated to cost about \$125,000. M. L. Fesenmier is president.

The Automobile Maintenance Association, Pittsburgh, has leased the building at Penn and Pacific avenues, for the establishment of a service and repair works.

Detroit

DETROIT, Aug. 7.

The Ford Motor Co., Highland Park, Mich., will take bids this month for its proposed one and two-story plant at Flat Rock, Mich., for the manufacture of plate glass for windshields and other service in connection with its automobile production. The works will cost in excess of \$1,000,000 and will include a power house and other buildings. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Egyptian Portland Cement Co., Fenton, Mich., has leased the former car shops of the Grand Trunk Railroad at Port Huron, Mich., and will remodel the buildings for new works. It is planned to begin operations early in 1923.

The Hupp Motor Car Corporation, 3501 East Milwaukee Street, Detroit, has construction under way on two four-

story additions, to increase the floor space by about 500,000 sq. ft., making a plant area of over 1,570,000 sq. ft. It is expected to have the structures ready for service by the end of the year.

The Brewer Mfg. Co., Inc., 1103 Front Avenue N.W., Grand Rapids, Mich., which has taken over the patent rights owned by Governor Laporte Brewer, Grand Rapids, will erect a plant this year and expects to be able to manufacture the Brewer spark plug by Jan. 1. Frank P. Allen & Son, Grand Rapids, are already working on the plans. It will be in the market for equipment and material such as screw machines, spinning machines, punch presses, electric motors, oil furnaces, hex rod cold rolled steel, rod brass, sheet brass, hex brass nuts, electrode wire, manganese wire, porcelains, porcelain cement, crude oil for furnaces, aluminum or manganese nickel, gaskets, asbestos copper lined, crude oil heating equipment and printing office equipment. Until the plant is ready for operation work will be done by contract. The officers of the company are: President, C. G. Brewer; vice-president, J. A. Brewer; secretary and sales manager, C. E. Farrington; treasurer and advertising manager, R. E. Brewer.

Chicago

CHICAGO, Aug. 7.

THE local machine tool market is dull, but the decline in demand is believed to be due to the coal and railroad strikes and a revival in activity is expected as soon as settlements are reached. The railroad lists will remain dormant so long as the shopmen's strike continues. Uncertainty as to coal supply seems to explain the increased caution of other buyers. The International Harvester Co., after buying a few machines against its inquiry, has indefinitely postponed action on the remainder of the list. The Continental Motors Co. continues to place scattered orders and the Studebaker Corporation, South Bend, Ind., has added to its recent liberal purchases, having placed 17 special lathes for turning pistons and 23 plain grinding machines. The reported purchase by the Ford Motor Co. of a site for a \$10,000,000 assembling plant at East Chicago, Ind., will mean the purchase of considerable machine tool equipment, if true.

Prices remain substantially unchanged. The Rhodes Mfg. Co., Hartford, Conn., however, has announced reductions of 15 per cent on its line of small shapers and slotters. The P. Prybil Machine Co., New York, has reduced metal spinning lathes 10 to 15 per cent.

The Atchison, Topeka & Santa Fe is expected to close soon for a 150-ton electric crane for its Albuquerque, N. M., shops. This inquiry has been before the trade for several months. The Milwaukee Sewerage Commission has bought a large overhead electric crane from the Milwaukee Electric Crane & Mfg. Co. The University of Chicago has placed an order with the Whiting Corporation for a 10-ton hand power crane for its power house. The Thomas Furnace Co., Milwaukee, Wis., has ordered a 25-ton electric reservoir ladle from the Whiting Corporation.

The Donahue Steel Products Co., Chicago, has sold a 3½-in. Ajax upsetting and forging machine to the Richmond Car Works, Richmond, Va., and a 4-in. Acme upsetting and forging machine to the Steel Car Forge Co., Elwood City, Pa. These two sales represent an aggregate outlay of about \$16,000.

The Ford Motor Co. has purchased 60 acres on the Indiana Harbor Canal, East Chicago, Ind., for an assembling plant to cost \$10,000,000, according to a report from Gary, Ind. The location of the plant will enable the company at Detroit to ship parts in bulk by water to East Chicago. The tract not only has considerable frontage on the canal, but is also located on the Chicago & Indiana Southern Railroad, the Wabash, the Indiana Harbor Belt and the Elgin, Joliet & Eastern.

The Standard Metal Screen & Weather Strip Co., recently incorporated with \$50,000 capital stock, with general offices at 139 North Clark Street, Chicago, has acquired 8000 sq. ft. of floor space at 3753 South Halsted Street, which will be used as a factory and assembling plant. It will manufacture all metal screens and weather strips, radiator covers, roofing, shades and awnings and window ventilators. Pending the construction of its own complete manufacturing unit, the company has arranged for the manufacture of various products on contract with the Kawneer Co., Niles, Mich. It contemplates the purchase of rolling machines, shears and brakes, although the number installed will be limited to those now on hand until business requires additional equipment. The officers are: President and general manager,

Gunnar F. Nordblad; secretary and treasurer, C. Walter Keeling, and general counsel, Ferdinand J. Karasek.

The Planet Piston Corporation, Belleville, Ill., recently incorporated with \$50,000 capital stock, has leased a plant and purchased equipment and is now in active operation. About 50 lathes are employed and no additional equipment will be purchased for a time. It manufactures a non-expandable aluminum alloy piston for use in gasoline engines. The officers are: President, Steven D. Hartog; vice-president, Charles Procasky.

V. Malik, 2815 South Trumbull Avenue, Chicago, has let contract for a one-story automobile repair shop, 50 x 55 ft., at 4031-35 West Twenty-fourth Street, to cost \$6000.

The Sullivan Machinery Co., Chicago, has awarded a general contract for a one and two-story plant at Michigan City, Ind., to cost \$1,000,000. The construction of the foundation is now in progress, the contract having been let some time ago.

M. R. Thackaberry & Son, Sterling, Ill., are erecting a one-story machine shop, 20 x 36 ft., in the rear of the Hutton Bottling Works on West Fourth Street, to be used in connection with their garage.

The Biflex Products Co., manufacturer of automobile bumpers, North Chicago, Ill., has increased its capacity 150 per cent by the purchase of a foundry adjoining its plant, which formerly belonged to the Chicago Hardware Foundry Co.

The B. C. Chatfield Iron Works has commenced the construction of a foundry, 35 x 80 ft., at Gladstone, Mich. It will make bronze and gray iron castings. B. C. Chatfield, owner of the new Gladstone company, was associated for several years with the Chatfield Brass & Iron Works at Escanaba, owned and operated by his father, O. P. Chatfield.

Fire recently destroyed the round house of the Chicago, Milwaukee & St. Paul Railroad at Bedford, Ind., with a loss estimated at \$25,000.

Fire of unknown origin recently gutted the third floor of the Island Avenue plant of the Aurora Silver Plate Mfg. Co., Aurora, Ill., doing damage estimated at \$75,000.

The Barnwell Mfg. Co., manufacturer of bathroom fixtures, curtain rods, etc., is installing manufacturing equipment in space which it has leased on the lower floor of the Nulyne Laboratories Building, Wildwood Avenue, Jackson, Mich.

The Danley Sanitary Mfg. Co., St. John, Mich., manufacturer of sanitary feeding batteries for poultry, as well as cooling racks and other poultry equipment is building an addition, 45 x 60 ft., which will double its capacity.

The Paramount Wheel & Engineering Co. will locate a plant at Hartford City, Ind., for the manufacture of metal automobile wheels. The Chamber of Commerce of that city has purchased a site and will donate it with switching facilities to the company. Work is to be started at once on the factory, which will employ 200.

William M. Curtin and David G. Smith have opened a machine and general repair shop at 1842 East Miner Street, Desplaines, Ill.

The F. J. Lewis Mfg. Co., 2513 South Robey Street, Chicago, manufacturer of coal tar products, has purchased a 100-acre site for a factory between 108th Street, 112th Street, Avenue F and the State line. It is now building a \$1,000,000 plant at Granite City, Ill., and owns works in Dover, Ohio; Moline, Ill.; Chattanooga, Tenn., as well as in Chicago.

The Star & Crescent Milling Co., South Chicago, Ill., has started the construction of a one-story power house to cost \$35,000.

The J. L. Clark Mfg. Co., Rockford, Ill., manufacturer of metal cans and containers, will commence the erection of the superstructure for a one-story addition, 60 x 190 ft.

The Tomboy Mine & Milling Co., Telluride, Col., is planning to rebuild its machine shop and other departments destroyed by fire, July 8, with loss estimated at about \$50,000.

A vocational department will be installed in the new high school to be constructed at Scribner, Neb., for which bids on a general contract are being received until Aug. 16. It will be two stories and basement, 70 x 100 ft., and estimated to cost close to \$90,000. Grabe & Helleberg, Columbus, Neb., are architects.

The Common Council, Storm Lake, Iowa, will build a new electrically-operated pumping plant at the municipal waterworks, estimated to cost about \$100,000, including equipment. Roy U. Kinne is city clerk.

The Hi-Power Tool Corporation, Jackson, Mich., recently organized to manufacture reamers, hobs, milling cutters and kindred specialties, has acquired the local building formerly occupied by the Jackson Machine Co., and will soon commence the installation of equipment for its proposed new plant. It is expected to begin production early in the fall. M. C. Townley is president, and Watson R. Smith, treasurer and general manager.

The Wills-Sainte Claire Co., Marysville, Mich., manufacturer of automobiles, has preliminary plans under way for the construction of an addition to its local plant. C. H. Wills is president.

The Board of Education, Saginaw, Mich., will build a one-story power house in connection with a new two-story school building on Webber Street, estimated to cost about \$250,000. J. F. Beckbissinger, 114 South Jefferson Avenue, is architect.

The Universal Portland Cement Co., 210 South LaSalle Street, Chicago, Ill., has completed plans for the construction of an addition to its mill No. 7, Duluth, Minn., estimated to cost about \$200,000, including equipment.

The Dubuque Electric Co., Dubuque, Iowa, will soon commence the construction of a three-story addition to its local power plant, 62 x 67 ft., estimated to cost about \$300,000, including machinery.

The Electrical Engineering Co., Chicago, manufacturer of electric transformers and kindred products, has removed its plant from 322 East Forty-first Street to 2014 Wabansia Avenue, where the floor area will be increased about 200 per cent.

The Chicago, Burlington & Quincy Railroad, 547 West Jackson Boulevard, Chicago, has awarded a contract to the Home Builders, Inc., Omaha, Neb., for the construction of a new engine house, with shop facilities, at Council Bluffs, Iowa, to include a one-story machine shop and power house.

The McDougall Terminal Warehouse Co., 510 Alworth Building, Duluth, Minn., has plans under way for a new ice manufacturing and refrigerating plant on Railroad Street.

Ohio

WHILE machine tool inquiry in Cincinnati has been somewhat affected by the railroad and coal strikes, orders booked the past week showed a decided improvement over the two previous weeks. Engine lathes appear to be in good demand, several manufacturers stating that their July business was the best since 1920. The situation is spotty, however, some makers reporting satisfactory orders, with others showing a falling off compared with the month of June. One of the largest contracts the past week was placed by an Eastern electrical manufacturer for a number of milling machines. Other orders include punch presses, small planers and automatic screw machines. A local manufacturer which recently commenced building plate shearing machinery, reports the sale of two of its machines to steel plants with a third under negotiation. Railroad buying is light and a number of lists on which bids have been submitted have been held up. It is expected that the Louisville & Nashville, however, will shortly close on several tools, including a large planer. Dealers report a fair amount of orders, with inquiries still under negotiation. Used tools continue in demand, although prices on good second-hand machines are now nearly as high as on new machines of similar make.

The Henry Vogt Machine Co., Louisville, Ky., is planning the erection of an addition, three stories, 50 x 80 ft., to cost \$40,000.

The Dayton Engineering Laboratories Co., Dayton, Ohio, manufacturer of Delco products, will resume the erection of an addition begun in 1920, but abandoned after the foundation was completed. It will be six stories, 190 x 350 ft., with 335,000 sq. ft. of floor space. Products now manufactured by outside firms will be made in the new building, which will also house the service department, now located at Moraine City.

The Brightman Mfg. Co., Columbus, Ohio, manufacturer of shafting machinery, bolts and nuts, has been reorganized with L. H. Brightman, president, S. D. Shearer, vice-president, and Paul A. DeLong, secretary-treasurer.

The Portsmouth Stove & Range Co., Portsmouth, Ohio, which recently awarded contract for a three-story addition, has decided to add two additional stories to take care of business expansion, which during the past year has been large. A complete enameling department will be installed in the new building.

Fire at the plant of the Motors Sheet Steel Co., Beach City, Ohio, July 20, caused a loss of about \$2,500, fully covered by insurance. The fire started in the refining room where the palm oil is cooked down and burned that building, also the boiler room building, and a part of the roof over the pickling department. The fire was checked before it reached the main building or any of the other departments.

None of the main machinery was damaged to any extent, but when the pipes fell connecting the sulphuric acid tank with the pickling department the company lost its complete stock of sulphuric acid, but a new supply was secured, the insurance adjusted, and the plant again put into operation Aug. 25.

The Common Sense Piston Ring Mfg. Co., according to Thomas McGeachie, chairman of the executive committee of the Heather Rubber Co., Lorain, Ohio, will lease a building for a period of three years for the purpose of manufacturing the piston ring in Lorain. The company is in the market for machinery, either new or second hand, which could be used for the purpose.

Milwaukee

THE machine-tool trade is getting no better or worse, but is undergoing constant changes, due to the uncertainties of the coal and railroad labor situation. Shops in urgent need of tools are sending in rush orders, imparting a semblance of greater activity, but volume is not showing any increase, for other shops are holding off to await developments. This includes railroads, which still postpone ordering on extensive lists of requirements. Locally, the fuel situation is steadily growing more acute and some manufacturers in the metal trades are chary about accepting new business as freely as before, which has a reflex upon the tool trade.

The Belle City Malleable Iron Co., Racine, Wis., has begun work on a plant extension project which will require a year and involve a total investment of \$750,000 in new buildings, equipment, etc. The present construction represents an investment of \$400,000 and is to be completed by the end of the year. A contract has been let to Nelson & Co., local, for a 260-ft. extension to the annealing building and an order has been placed with the American Dressler Tunnel Kilns Co. for annealing ovens. Part of the building also will be used for a gas producer plant. A new administration building will be erected in place of the one now occupying the site of the annealing building extension. Other details of the project will be made public later.

The Wisconsin Clay Products Co. of Kenosha, Wis., incorporated recently with \$100,000 capital, has placed the contract for the entire equipment of a new face and common brick plant with a daily capacity of 100,000 brick, with E. M. Freese & Co., Gallon, Ohio. The plant will occupy a site of 15 acres at Burlington Road and Howland Avenue. Joseph Orth is president, and Charles Tyson, treasurer and works manager.

The Air Reduction Sales Co., Inc., 342 Madison Avenue, New York, which announced its intention of establishing a branch plant in Milwaukee, will not immediately undertake any considerable amount of new construction, having purchased the machine shop of the Petit Mfg. Co., 1505-1515 Buffum Street. This is 60 x 120 ft., part two stories and basement, and will be remodeled to some extent, as well as re-equipped throughout. It is to be ready for operations about Nov. 1.

The Milwaukee Woven Wire Works, 3014-3020 Clarke Street, Milwaukee, has awarded contracts for a new brick and mill factory, with concrete foundation, 131 x 138 ft., part three stories. The general contractor is C. F. Behnke, 827 Thirty-fourth Street, local. With looms, motors and other equipment, the investment will be about \$125,000. O. G. Marquardt is president and treasurer.

The Rockwell Mfg. Co., 572 Park Street, Milwaukee, manufacturer of hardwood finish, interior woodwork, fixtures, etc., has placed contracts for a one-story brick and mill addition, 54 x 200 ft., which will require a considerable list of wood-working machinery with individual electric motor drive. Louis C. Nuesse is secretary.

The S. E. Tate Printing Co., 133 Second Street, Milwaukee, has plans for a new four-story printing and publishing plant, 60 x 125 ft., estimated to cost \$200,000 complete, and to be erected at 496-502 Broadway. Practically a new equipment of presses, typesetting machines, metal furniture, fixtures and special machinery will be installed. E. L. Arnold is president and general manager.

The Wisconsin Upholstery Spring Co., Sheboygan, Wis., has been incorporated with a capital stock of \$50,000 as the successor of a partnership business established about four months ago which manufactures cushion springs. It occupies a modern building at Calumet Drive and Winter Court. J. M. Spiller and A. M. Miller continue the principal owners and managers.

The Gilson Brothers Co., Fredonia, Wis., founder and machinist and manufacturer of corn husking machines, concrete mixers, etc., will build a new gray iron foundry, 40 x 120 ft., and rebuild the present casting shop into an addition to the machine shop. It is estimated that about \$40,000 will be invested in buildings and equipment.

The Biggam Trailer Co., formerly of Milwaukee, on Monday, Aug. 7, commenced initial operations in its new factory, occupying 16,000 sq. ft. in the Racine Industrial Community Building at Racine Junction, Wis. It manufactures trailers in capacities from 800 lb. to 5 tons under contract with motor truck manufacturers rather than distributing its product among truck owners. The corporation is capitalized at \$265,000 and its new officers are: President and general manager, H. F. Biggam; vice-president, George L. Buck, Racine; secretary and purchasing agent, L. E. Pitter, Racine.

The W. A. Knaak Motor Co., 1301 Georgia Avenue, Sheboygan, Wis., is erecting a \$25,000 addition to its garage, service and machine shop building which will require some miscellaneous equipment.

The United Shoe Last Co. is erecting a new factory at Crystal Falls, Mich., which will represent a total investment of nearly \$150,000. It consists of a main factory, 60 x 240 ft., a power plant, 30 x 50 ft., and warehouse, 58 x 400 ft.

The Chippewa Valley Auto Co., Chippewa Falls, Wis., has engaged E. J. Hancock, architect, Eau Claire, Wis., to design a new \$75,000 sales and service building, 124 x 132 ft., two stories and basement. The machine and repair shop will occupy a space of 42 x 132 ft. and practically all equipment will be new. Fred A. Bigler is president and general manager.

The municipal waterworks department, Menominee, Mich., is building a two-story machine shop, 48 x 50 ft., and will buy a small list of machinery.

The Sparta, Wis., Board of Education awarded the general contract for the construction of a new high school with manual training department to Naset Brothers, local. It will cost about \$200,000.

The Simplicity Engine & Mfg. Co., Port Washington, Wis., has increased its capital stock from \$25,000 to \$50,000 to provide additional facilities for enlarged production. Details are not yet available.

The Jenkins Machine Co., Sheboygan, Wis., which is enlarging its foundry and machine shops, has increased its capital stock by \$100,000, so that the issues now consist of \$200,000 preferred and \$100,000 common stock.

The Central South

ST. LOUIS, Aug. 7.

The C. Hager & Sons Hinge Mfg. Co., 2427 DeKalb Street, St. Louis, manufacturer of hinges and other hardware products, is taking bids for a two-story addition, 60 x 120 ft., estimated to cost about \$50,000. Helfensteller, Hirsch & Watson, Chemical Building, are architects.

The Apex Coal Co., Lynchburg, Va., is planning for the construction of a new tippie at its properties near Sergeant, Ky. Other machinery, including electric equipment, will also be installed.

The Pauline Oil & Gas Co., Duncan, Okla., will build a new oil refinery on a site about six miles from Duncan, for handling about 700 bbl. of crude oil per day. It is estimated to cost about \$65,000.

The Broderick & Bascom Rope Co., 4500 North Main Street, St. Louis, manufacturer of wire rope, cables, etc., will soon call for bids for two additions, one and two stories, 143 x 500 ft., and 85 x 500 ft., respectively, estimated to cost about \$250,000, including equipment.

Fire, Aug. 2, destroyed a portion of the lard refining plant of Morris & Co., St. Joseph, Mo., with loss estimated at about \$100,000, including machinery. It is planned to rebuild. Headquarters of the company are at Chicago.

E. B. Smith, Joplin, Mo., is organizing a company to construct and operate a plant at Purcell, Mo., for the manufacture of concrete blocks and kindred products.

The Woody Motor Co., Madill, Okla., has tentative plans for rebuilding its service and repair works, destroyed by fire, July 27, with loss estimated at \$60,000, including equipment.

The Louisiana & Arkansas Railway Co., Texarkana, Ark., is taking bids until Aug. 14, for a one-story locomotive repair shop, 160 x 280 ft., at Stamps, Ark. It will cost about \$150,000. Harrington, Howard & Ash, Orear-Leslie Building, Kansas City, Mo., are engineers.

The Bevis Salt Co., Lyons, Kan., has plans under way for extensions. New electric turbines and auxiliary equipment will be installed. The work is estimated to cost about \$175,000.

Fire, July 26, destroyed the service building and repair shop of the Koup Motor Co., 1529-31 Oak Street, Kansas City, Mo., with loss reported at \$50,000. It is planned to rebuild.

The Empire District Electric Co., Joplin, Mo., has made application for permission to construct a new hydroelectric power plant on the White and James rivers, near Branson, Mo., with ultimate capacity of 80,000 hp. The company is operated by the Cities Service Co., 60 Wall Street, New York.

The Caruthersville & Kennett Electric Light & Power Co., Kennett, Mo., has plans under way for extensions and improvements in its local electric power plant to cost about \$40,000.

The Cushing Refining & Gasoline Co., Cushing, Okla., recently organized by officials of the Mulberry Oil Co., with capital of \$500,000, has acquired the local refinery of Gustafson & Spencer, Inc. The new owner will make extensions and will operate in conjunction with the new gasoline producing plant to be constructed by the parent organization at Ingalls, Okla.

The Long-Bell Lumber Co., Long and Bannister streets, Kansas City, Mo., operating 13 mills in Arkansas, Louisiana, Texas and Mississippi, has arranged for a bond issue of \$9,000,000, a portion of the proceeds to be used for extensions and improvements. R. A. Long is chairman of the board.

The Iddins Machinery Co., Knoxville, Tenn., will soon take bids for its proposed one-story plant for the manufacture of agricultural equipment, estimated to cost about \$50,000.

The St. Louis Electric Welding Co., 2801 La Salle Street, St. Louis, recently organized, is planning for the installation of equipment in a local building, including electric welding apparatus, muffle and carbonizing furnaces, high speed welding equipment, etc. T. A. Oberchellman is secretary.

The Universal Car Co., Louisville, is planning the erection of a new one and two-story service and repair works, 100 x 225 ft., at Broadway and Twenty-fifth Street, estimated to cost about \$60,000. W. C. Martin is president.

A vocational department will be installed in the two-story high school building to be erected at Roxbury, Kan., for which bids on a general contract are being asked. Smith & English, Nelson Building, Hutchinson, Kan., are architects.

The Oklahoma Gas & Electric Co., Oklahoma City, Okla., is perfecting plans for a new hydroelectric generating plant on the Arkansas River, about four miles from Muskogee, Okla., estimated to cost close to \$2,000,000, including machinery.

The Gulf States

BIRMINGHAM, Aug. 7.

The Kerr Tire Co., Fort Worth, Tex., has acquired a site for the erection of a new plant at Niles City, Tex., to have a daily capacity of about 2000 tires.

The American Well & Prospecting Co., Corsicana, Tex., manufacturer of oil well equipment, machine parts, etc., has plans in progress for a one-story addition, 50 x 100 ft.

Ryan & Knight, Inc., 214 West Flagler Street, Miami, Fla., has awarded a contract to John Bullen, Miami, for a three-story automobile service building, 100 x 100 ft., with machine shop for repairs and parts manufacture. S. A. Ryan is president.

The Rayville Ice Co., Rayville, La., recently organized by officials of the Consolidated Ice Co., Monroe, La., has acquired a site for a new ice-manufacturing and refrigerating plant, for which plans are being prepared. Paul Fudicker and W. W. Johnson head the company.

The Dallas Power & Light Co., Dallas, Tex., has made application for permission to build an addition to its electric power plant, estimated to cost \$2,180,000. Plans have been prepared. C. E. Calder is president.

The Standard Carbon Co., Swartz, near Doss, La., will commence the erection of a new gasoline extraction plant, estimated to cost about \$80,000, including machinery.

Loading and unloading machinery and other freight handling equipment will be installed in the new freight station to be constructed by the San Antonio & Aransas Pass Railway Co., San Antonio, at Waco, Tex., estimated to cost about \$200,000.

The Pelsang Boat Works, Inc., Miami, Fla., recently organized with a capital of \$500,000, will establish a marine construction and repair plant. Operations will commence at an early date.

The Citra Ice, Light & Development Co., Citra, Tex., is planning the erection of a new electric power plant. It will also build a new ice-manufacturing and cold storage plant, with daily capacity of about 10,000 tons.

A vocational department will be installed in the new high school to be erected at Wortham, Tex., for which plans are being prepared.

The Magnolia Oil Co., Sabine, Tex., is planning to rebuild the portion of its local distributing plant, destroyed by fire July 28 with loss estimated at \$175,000.

The City Council, Vero, Fla., has plans for extensions and improvements in the municipal electric light and power plant to cost about \$40,000.

Smoak & Goan, Eustis, Fla., will soon commence the erection of a one-story machine and automobile repair shop, 60 x 100 ft. A list of equipment is being arranged.

The Gould Mfg. Co., Birmingham, recently organized with a capital of \$500,000, is planning the establishment of a factory to manufacture windshields and other automotive products. F. E. Gould heads the company.

Freight handling and conveying machinery will be installed in the new freight station to be constructed at Dallas, Tex., by the Atchison, Topeka & Santa Fe Railroad, 50 East Jackson Boulevard, Chicago. The first unit will be 60 x 300 ft., and will cost about \$200,000; it will be supplemented by an addition to cost about \$125,000.

The O. K. Ice Co., Clermont, Fla., will receive bids until Aug. 30 for an ice-manufacturing and cold storage plant, including equipment. F. B. Krieder is general manager.

A vocational department will be installed in the new three-story high school to be erected at West Palm Beach, Fla., estimated to cost about \$125,000, for which bids will be received about Sept. 15. William Manly King, Palm Beach, is architect.

The Texas-Pacific Coal & Oil Co., Ranger, Tex., is planning the erection of a new gasoline absorption plant near Canby, Tex., estimated to cost about \$100,000, including machinery.

A vocational department will be installed in the new high school to be erected at Highland Park, Dallas, Tex., estimated to cost about \$125,000.

California

SAN FRANCISCO, Aug. 1.

The Chevrolet Motor Co. of California, Sixty-ninth Avenue and Foothill Boulevard, Oakland, has had plans prepared for an addition to manufacture automobile bodies. W. C. Williams is manager.

The Pacific Asbestos Corporation, Oakdale, Cal., has preliminary plans under way for a new asbestos mining and manufacturing plant to include machine shop, power house and other buildings. W. A. Sutherland, president Fidelity Trust & Savings Bank, Fresno, Cal., is one of the heads of the company.

Plans have been completed for the construction of a one-story power house at the Fullerton High School, Fullerton, Cal., 40 x 112 ft. Carleton M. Winslow, 1134 Van Nuys Building, Los Angeles, is architect.

Ira G. Wagner, Sparks, Nev., is organizing a company to build and operate a new ice-manufacturing and refrigerating plant at Marysville, Cal. Negotiations are under way with the Marysville Chamber of Commerce, regarding a site.

The Public Service Commission, 210 South Broadway, Los Angeles, has had plans prepared for seven power houses, to be used in connection with local municipal service, estimated to cost about \$6,000,000, including machinery. E. F. Scattergood is chief engineer.

Officials of the Shasta Lumber Co. and the Union Lumber Co., Marysville, Cal., have organized a new company to build a plant to manufacture brick and tile products. The initial works will have a capacity of about 10,000 brick per day. L. E. Hite and Calvin Smith, Marysville, are also interested in the company.

The Concrete Pipe Co., Board of Trade Building, Portland, Ore., will commence the immediate erection of a new two-story plant, 114 x 120 ft., on Page Street, estimated to cost about \$25,000.

The Alaskan Engineering Commission, purchasing department, Seattle, Wash., will take bids until Aug. 16, for the following equipment, Circular 582: 100 end blocks with bolts; 50 guard rail clamps; 12 switch stands; 25 sets of split switches; 12 rigid bolted frogs; 100 rail clamps; 120 cast iron carwheels; 12 solid steel carwheels; 100 locomotive driver brake shoes; 750 boiler tubes, and other equipment.

Indiana

INDIANAPOLIS, Aug. 7.

The Inland Body Co., Indianapolis, manufacturer of automobile bodies, is planning the erection of new works at Columbus, Ind. The present business will be removed to the new location and additional equipment installed. The Columbus Chamber of Commerce is interested in the project.

The Indiana & Michigan Electric Co., South Bend, Ind., will commence foundation work at once for the erection of a new hydroelectric generating plant at Kings Landing, St. Joe River, estimated to cost about \$1,500,000, including machinery.

Fire July 30 destroyed the plant of the Salem Stone Co., Bedford, Ind., including machinery, with loss estimated at \$100,000. The engine house of the Chicago, Milwaukee & St. Paul Railroad, on adjoining site, was partially destroyed by the same fire, with loss of about \$25,000. The Salem company is operated by the Indiana Quarries Co., which proposes to rebuild.

The Indiana General Service Co., Muncie, Ind., has arranged for a bond issue of \$3,322,000, a portion of the

proceeds to be used for extensions and improvements in power plants and system. R. E. Breed is president.

D. R. Ulmer, Terre Haute, Ind., has organized a company to establish a plant to manufacture sewer pipe, conduit and kindred products. The initial works will have a daily capacity of about 3000 tile lengths and blocks. Ernest Cox is manager.

The Kentucky Tire Pump Co., Madisonville, Ky., has arranged for the removal of its business to Evansville, Ind., where an enlarged works will be established.

A vocational department will be installed in the new high school to be erected at Terre Haute, Ind., for which a site has just been acquired at Twenty-fifth and Poplar streets, estimated to cost about \$700,000. Johnson, Miller & Miller, 30 North Fifth Street, are architects.

The United States Quartermasters' Depot, Jeffersonville, Ind., will establish a new brass foundry in connection with its local plant. A portion of one of the existing buildings will be used.

The Olin Sales Co., 515 North Meridian Street, Indianapolis, Ind., has plans under way for a new three-story automobile service and repair works, 60 x 195 ft., at 720-22 North Meridian Street, estimated to cost \$150,000.

The Ford Motor Co., Highland Park, Mich., is reported to be considering a site at Alexandria, Ind., for the construction of a branch plant. A local committee has been formed, headed by Dee R. Jones, city attorney, to arrange details. It is said that the plant will cost in excess of \$200,000.

The Indiana Service Corporation, Fort Wayne, Ind., will make extensions and improvements in its local power plant to cost about \$250,000, including buildings and equipment.

Canada

TORONTO, Aug. 7.

THE demand for machine tools continues about the same as in the past three or four weeks. Buyers have not commenced to enter the market with big lists and the greater part of the demand is for one or two tools. Notwithstanding that many new manufacturing plants are under construction, interests behind these undertakings are withholding orders as long as possible, but dealers look for the development of considerable activity early next month. The automotive industry is about the most consistent buyer, but purchases are chiefly for replacement. Wood-working equipment is in active demand and manufacturers report a steady inflow of orders. The demand for small tools continues good and order books are rapidly filling up, both for spot and future delivery. Prices in some districts are unsteady and price cutting is again being resorted to. No definite announcement has been made, however, regarding new lists.

The fuel situation is also having some effect on demand. The shortage of fuel is causing some concern to companies having small supplies on hand and unless some provision is made whereby coal can be secured it is likely that many will find it necessary to greatly curtail operations if not close down entirely. In some districts the supply of electric power is short and industrial plants in these localities have been forced to cut down operations.

The general contract for an addition to the plant at Leaside, Ont., for the Durant Motors of Canada, Ltd., Royal Bank Building, Toronto, to cost \$750,000, has been awarded to Norman McLeod, Ltd., Kent Building, Toronto.

The sawmill at Thompson River, B. C., owned by the Northern Construction Co., Kamloops, B. C., was destroyed by fire with a loss of \$100,000.

The Town Council of Montreal North, Que., will build an addition to the waterworks plant to cost \$125,000. F. C. Laberge, 30 St. James Street, Montreal, is engineer.

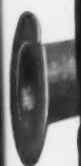
Plans are being prepared for the erection of a paper mill at Hartville, N. S., for the Premier Paper & Pulp Co., 91 Hollis Street, Halifax, N. S. George F. Hardy, New York, is architect.

The Algoma Steel Corporation, 503 Queen Street East, Sault Ste. Marie, Ont., proposes to erect a heat treating plant at a cost of \$50,000.

The Kingston Road Lumber Co., Ltd., 828 Kingston Road, Scarboro Junction, Ont., will build a planing mill and purchase equipment at an early date.

The Linde Canadian Refrigeration Co., St. Peters Street, Montreal, will build a factory at Lachine, Que., to cost \$40,000 and has let the general contract to Arthur Leduc, 351 Christopher Colomb Street, Montreal.

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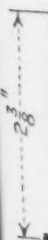


Fig. 2.
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